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EDITORIAL.

PRESIDENT ROOSEVELT has designated the Editor of this JOURNAL as one of three national delegates to the next session of the American Mining Congress which will meet at Portland, Oregon, in August.

ON ANOTHER PAGE we give a statement showing the changes made recently in the Mexican tariff, so far as they relate to iron, steel and other metals, and to machinery. It will be seen that the alterations made are generally increases in the duties levied, a matter of importance, considering our large trade with Mexico, and the heavy purchases of machinery and supplies now required by American companies owning Mexican mines.

THERE IS A good deal of mining activity in Peru at the present time, chiefly by reason of the stimulus imparted by the large operations of the Cerro de Pasco mines, which are controlled by Mr. J. B. Haggin. It is said that the capital expended has amounted already to $8,000,000; and this sum, when distributed in large part among a population of only 2,500,000, is apt to be encouraging to local interests. Other enterprises are also doing well; in the Yauli region, the Alpamina mine, belonging to the Gildemeister family, of Bremen, is making a large output, and good reports come concerning the San Miguel property in the Morococha district. Peru has a notable history from the miner's standpoint, and it is a region much of which has not yet undergone modern exploitation.

THE SIMILARITIES and repetitions of mining nomenclature often produce confusion; a case in point is that of La Luz and Nueva Luz mines at Guanajuato. A disclaimer appearing under 'Correspondence' will explain itself. We should be sorry to believe that La Luz Tunnel undertaking is being taken seriously by English investors, because the prospectus contains several obviously silly statements, and the evidence of a sound mining enterprise is not furnished in any of the reports which we have seen. "Tunnel schemes," or more correctly, explorations by adit, appeal to the least intelligent of mining investors, be-

cause of their vague potentialities and evident possibilities. They are rarely remunerative, and represent the least desirable form of mining investment.

THE STRIKE which is tying up traffic on the Great Lakes, and causing embarrassment to shippers of coal and iron ore, is singular, in that it comes from the top. It is not the sailors or firemen, but the ship-masters and pilots who are on strike. It is very much as if a mining district should be tied up, while miners and laborers were willing to work, by a strike of the mine superintendents and consulting engineers. In this case it is almost impossible to call in outside assistance, owing to the difficulty of finding masters and pilots who have the government certificates required by law before persons can hold those positions. The lake shipping trade has been closely unionized during the past five years, and vessel owners are feeling the results.

IT IS UNFORTUNATE that just when the people of Colorado are trying their level best to end the disorders which have disfigured the recent history of their State, the eastern newspapers and magazines are beginning to make sensational reading matter out of their troubles. Several articles which have appeared recently are calculated to picture this great mining region as dominated by outlaws and given over to the picturesque ruffianism of a community on the outer borders of civilization. It is a temptation to the irresponsible scribe to make copy out of some of the incidents at Telluride and Cripple Creek, be-spattering his descriptions with romantic inaccuracies such as amuse the man in New York and annoy the man at Denver. To counteract these misrepresentations, we take pleasure in reproducing a sensible letter which recently appeared in *The Evening Post* of this city; the article was written at Colorado Springs by an anonymous writer, whom we compliment on the moderation of his tone and the reasonableness of his protest against current exaggerations.

IN OUR DISCUSSION department there appears this week a supplementary contribution by Mr. W. H. Freeland, in the course of which he states that a reduction of cost amounting to 3 cents per pound of copper was effected at the Ducktown smelter by the introduction of the pyritic method. Well-authenticated evidence such as this is worthy of a great deal of debate, and will be properly appreciated by other metallurgists. In this connection it may be well to draw attention to the confusion often arising between the identity of the two companies in Tennessee; the one which is now using pyrite smelting is the Ducktown Sulphur, Copper & Iron Company, Ltd., at Isabella; of this Mr. Freeland is general manager; the other, which is about to change from heap roasting to the direct pyritic, or raw, smelting is the Tennessee Copper Company, of which Mr. Wm. Heywood is manager, and Mr. J. Parke Channing, the president and consulting engineer. Both of these enterprises exhibit the commercial value of technical skill when properly applied to mining and metallurgical work.

THE LETTER which we publish in our Correspondence column, from Manila, calls attention to a state of affairs which is not creditable to American enterprise. The acquisition of the Philippines, after the Spanish war, was advocated on the ground of the opening presented for American trade. But American trade has not taken advantage of it, and we are now spending money on the Islands for the benefit of other people. Our correspondent's comments are confirmed by the facts shown in the trade returns for 1903, recently published. Of the imports of iron, steel and machinery for that year, less than one-fourth was American; Germany, Belgium and Great Britain supplying the greater part. This is largely because the trade of the Philippines is in German and British hands, and Americans have made little effort to secure any of it. It is time for our manufacturers to wake.

THE DISPATCHES sent from London about an international conference of steel-makers seem to have been based on a rather slender foundation of fact. It is understood that there have been some negotiations between Col. Hunsiker, the representative of the United States Steel Corporation in London, and Herr Thyessen, a representative of the new German Steel Syndicate. As to the points to which the conference related, it is a matter of conjecture entirely, but it is assumed that some plan for regulating competition and preventing too low prices has been discussed. What measures have been, or may be, adopted is absolutely unknown to outsiders. It is altogether uncertain, indeed, whether anything will come of the matter.

It is an open secret that the German steelmakers are tired of selling at very low prices to secure foreign trade. It is quite as probable also that the United States Steel Corporation is not anxious to sell at low export prices this year, and thus furnish an object lesson on "dear goods for home consumption and cheap ones for the foreigner," in a campaign in which the tariff will inevitably be discussed. Both sides, probably, would like an agreement, but can hardly make one without the British steelmen, who are not in a position to make one which would hold, even if the leading makers could be brought together. Altogether, we need hardly look for an international combination this year.

MINING EDUCATION.

The discussion on the education of mining engineers, started by Mr. Jenkins' paper on the equipment of laboratories, is being maintained with vigor at the meetings of the Institution of Mining and Metallurgy, in London. Some of the contributions to our columns have been reprinted in the reports of the Institution. On another page will be found a letter by Mr. Robert H. Richards, professor of mining at the Institute of Technology, at Boston.

The author of 'Ore Dressing' is sure to command a respectful hearing. He is one of many well-known teachers who have enriched the discussion by the expression of their views; in fact, professors and instructors have had the field pretty much to themselves, as is quite natural, but, on the whole, rather regrettable, for we venture to say that the opinions of engineers in the field, who have learnt in the actualities of life how much or how little their academic training has helped them, would be more likely to indicate the weak points in present methods of engineering education. Most men who have graduated in the greater school in life are apt to growl over the inept instruction of their youthful days and are content merely—to growl! Seeing that most of them become the fathers of sons who follow in their footsteps, it is a pity that they do not take a greater interest in technical institutions by acquainting themselves with present methods, and then offering such advice as their own experience in professional practice may warrant. If the mining engineers and metallurgists of to-day put themselves in friendly touch with the professors of existing schools of mines, there will be given a stimulus to sound education such as will bring about results almost immediately, for the student of to-day is the engineer of to-morrow; it is not a case of doing something for posterity but of helping our younger brothers. The improvements of technical education is a matter which should appeal to the best professional spirit; it is practical patriotism.

'ORE IN SIGHT' AGAIN.

It is high time self-respecting engineers discarded the use of the term 'ore in sight' and allowed it to become a part of the phraseology of the inexact and deceptive. While the last year has seen a tendency among the more thoughtful of the profession to avoid a term which is intrinsically a contradiction, and potentially a snare, it is manifest from the reading of reports and prospectuses that the vagueness of the term continues to commend it not only to the cautious, who aim to be as non-committal as is permitted by the receipt of a large fee, but also to the scheming, to whom its alluring suggestiveness has attractions because it beguiles the investing public.

A recent incident in London gives point to these remarks. In the action brought against

Antony Gibbs & Sons—an action which the evidence failed entirely to sustain—the judge, presumably a well-informed man of more than average intelligence, said that a certain well-known geologist's report "was an estimate of the ore in the mine, while that of the witness was an estimate of the ore in sight—a very different thing." Yes, indeed, a *very different thing* it was in the case of the Lake George mines, which were in controversy in this particular case, and a very different thing is 'ore in sight' from 'ore in the mine' in many other cases; in fact it means ore probably opened up, ore positively blocked out, pay ore developed, metal-bearing rock too low to be worked profitably but still ore as distinguished from building stone, ore likely to be proved in the course of future development, ore actually measurable and ready for stoping—it has meant each one of these at various periods and places. It is high time that a phrase which was conceived in error and born in the iniquities of reckless finance should be consigned to the lumber room of things useless and unfit. If the readers of this JOURNAL will take pains to discard the term, and use plain business-like English to express what they do mean, then 'ore in sight' will shortly become recognized as the trademark of the fakir and the jargon of the ignorant. It savors of both already.

GOVERNMENT STATISTICS.

Among our book reviews this week will be found a criticism of 'Mineral Resources,' the volume for 1902 having just been issued from Washington. It is inevitable that the reviewer should be unable to resist the temptation to be a little sarcastic over a statistical book which appears a year and a half after the activities which it chronicles; indeed, there is a danger of people picking up the book and without looking at the date, assuming that it refers to 1903, instead of the year before that. On the face of facts some explanation is necessary for the belated nature of the publication. This explanation is found, in part at least, in the hindrances caused by an attempt to combine the labors of the Survey and the Census. The object of this collaboration was to avoid duplication of the field work and prevent the necessity of calling for duplicate reports; nevertheless, there was much confusion and delay, as was inevitable from the circumstances.

The editor of 'Mineral Resources,' being an officer of the Geological Survey, has always considered that trade conditions are best shown by the actual amount of material put on the market, while the director of the Census, being under the Department of Commerce and Labor, took the view that the amount of mineral taken out of the ground, even though it remained on the dump or in the bins, represented the result of the labor expended. Therefore, when the first sheets of questions were sent out to mine operators by the officers of the Survey, the replies ignored some of the distinctions introduced in the interest of the Census and gave merely the tonnage of material marketed instead of affording details which covered the amount mined. The returns were unsatisfactory; when operators who had, as they thought, answered the usual questions were asked to afford additional information, they took time to prepare it, different "special agents" were occupied in tracing the discrepancies, and on the whole a good many irritating hindrances were encountered by reason of the divergent purposes of the two lines of enquiry represented by the Census and the Survey, respectively. This explanation we make without any prompting from the government departments mentioned, but in justice to the 'Mineral Resources' and further, and more important, in order to point a moral. This obviously is that two departments should not be doing the work of one. The distribution of statistical work causes unnecessary expense and confusion, without apparent increase of efficiency.

BRITISH COLUMBIA MINES IN 1903.

The total value of the mineral production of British Columbia for the year 1903 is given in the report of Mr. W. F. Robertson, the provincial mineralogist, which has just been issued, as $17,495,954, showing an increase over 1902 of $9,404. This small gain, however, was due rather to increase in values of some of the mineral products of the Province than to a gain in quantities. In gold the total value reported for the year was $5,873,036, of which about five-sixths was from the quartz or lode mines, and about one-sixth was placer gold, the latter coming very largely from the Atlin and the Cassiar districts in the far North. The gold output showed a decrease from the previous year of $88,373, of which $75,653 was in lode gold. This decrease was chiefly due to the smaller output from the Rossland district. The heaviest falling off was found in silver, of which the output was 2,996,204 oz., or 921,713 oz. less than in 1902, and in lead, of which there was produced 18,089,283 lb., or 4,447,098 lb. less than in the preceding year. The causes of this loss we have frequently discussed. It is hoped that the current year will show a marked change in the silver-lead production, on account of the new system of bounties offered by the Canadian government. Already several important silver-lead mines, which had been closed down, have been re-opened and are again becoming producers.

Copper alone of the metals shows an important gain. The output in 1903 was 34,359,921 lb., an increase of 4,723,864 lb. over 1902. This, of course, is due to the operation of the large mines in the Boundary district, which are now successfully turning out copper on a considerable scale. Some gain also came from the Coast district and Vancouver Island, where a few mines are now productive.

In the production of coal, which was 1,168,194 tons, or 229,200 tons less than in the preceding year, a moderate decrease is shown, which was due chiefly to the lighter export to the United States. While British Columbia coal finds large sales in California, the demand, especially for steam uses, has been seriously diminshed in recent years by the consumption of fuel oil from the California wells. While coal production diminished, that of coke increased, however, having been 165,543 tons in 1903, a gain of 37,528 tons over the previous year. This gain is due largely to the demand from the various smelting works, which is steadily increasing.

While the reports show that production was generally smaller last year, it may be said that the statistics presented are true as a record of the amount of minerals actually produced and marketed; but, at the same time, they are not quite a just measure of the progress actually made in the mining industry of the Province. The past year has been in reality a period of considerable progress in putting the industry in a better and more secure position, and in many respects on a more stable basis. Thus, much work has been done in solving the question of treatment of the lower-grade ores of the Rossland mines; a way has been opened, as just mentioned, for the silver-lead mines to work at a profit; important discoveries have been made in the Lardeau and other districts, and on the Coast many promising mines have been brought to the producing stage. Moreover, the labor conditions have been somewhat improved, and some approach made to a better understanding between the mining companies and their employees. The period of boom for British Columbia passed several years since, and everything indicates that we have now seen the end of the depression which followed.

MARKET CONDITIONS.

May 25.

The quiet in general business which seems to have set in has been reflected in the metal markets, and trading all around has been on a very moderate scale. In copper, sales have been very light, and purchasers, both for home account and for export, are apparently taking very little interest. Prices, on the small business done, have been easier. Tin has also been somewhat easier, and current demand is only moderate. In lead there is about the usual demand, but the principal seller has lowered prices $3 per ton, chiefly in view of the weakness of the foreign markets. Spelter is also off somewhat in price, and galvanizers are taking very little metal. The Joplin miners are again somewhat excited about ore prices, but will hardly be able to prevent the establishment of a somewhat lower level.

Silver shows comparatively little change, prices being fairly steady, while there continues to be some demand for the East.

The iron markets are generally dull and weak, consumers adhering to the waiting policy, and buying only for immediate requirements. Shading in prices is reported.

The Western coal markets continue to suffer from the delay in opening lake traffic. Shipments to the Northwest have not begun as yet, and the lower lake ports are so crowded with coal that the railroads continue to refuse cars bound for those ports. Local trade is slow.

The seaboard bituminous coal trade shows no change in conditions. Prices remain slightly unsettled.

The anthracite market also shows no change so far as demand is concerned. Steam sizes are being rather pressed for sale. The hearing before the Interstate Commerce Commission in the anthracite railroad cases is now in progress.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

Basic slag, analyzing 14 to 19 per cent phosphoric acid, and 41 to 52 per cent lime, is used extensively as a fertilizer in Germany and France.

Brazil is the largest producer of monazite in the world. The deposits occur as beach sea sands, and their concentration has been effected by the action of the waves.

Realgar, used mainly in pyrotechny to give a brilliant white light, is artificially prepared by fusing together sulphur and arsenious acid.

'Rock soap' and 'mineral soap,' with patented trade names to signify its use as a soap, a medicinal plaster, etc., is a variety of clay found in quantity in Wyoming and elsewhere.

Something like 30 per cent of the weight of printing paper used in America is made up of white, fibrous talc, which occurs extensively in St. Lawrence county, New York.

Bauxite, before its true character was known, was used as an iron ore, and as a road metal. Now it is an important economic mineral for making aluminum and alum.

Metallurgy is an applied art. When employed in the practice of milling gold ores it should mean an extraction as large as is consistent with the least expense. Chemistry must be supplemented by common sense and mechanics by business in sight. It is this effective combination which has given the western mining industry its prosperity and progressiveness.

The most striking improvement in cement manufacture is the rotary-kiln method of calcination, which practically dispenses with manual labor. The idea originated in England, but Americans worked out and perfected the rotary kiln.

GOLD DREDGES IN CALIFORNIA.

By Our Special Correspondent.

A recent visit to Oroville by a committee of the California State Miners' Association was in the nature of a surprise to a number of the old miners who had not seen this district for several years. The extent of the industry and its rapid growth struck the visitors in a forcible way; not only the work done, but the amount of capital invested is very large. There are now 27 dredges at work near Oroville, all but five of them being at a distance away from the river, some of them a mile and some two miles, in fact. The olive and orange orchards are giving way to the dredges, and are being rooted up bodily and destroyed, the land being found more valuable for mining than for horticulture. In parts of the district the dredging companies have paid as high as $3,000 per acre for land which sold five years ago for about $40 per acre. The dredging industry has proved profitable, but requires capital, and most of this has come from outside of California. Expensive dredging machinery must be purchased, lands bought and shops equipped, so that it can only be carried on profitably by a considerable capital, owing to the necessary preliminary outlay.

The latest type of dredge in use—the Bucyrus—is a machine having a capacity of 2,500 cu. yd. per day. These machines are digging to a depth of about 30 ft. below the water line, throwing out the large boulders and débris to even a greater height above the water. As a rule, it requires nine men to run a machine, three on each shift of eight hours. With the electric power generally used, one man controls the action and keeps watch to see that everything is right, while one other stays on the shore to tend the lines, etc. One of the old miners on the committee remarked that a good miner can pick and shovel into a sluice about 2.5 cu. yd. daily, while one of these machines handles 2,500 cu. yd., or the work of 1,000 men; while it works far below the water line on material of a value that the old-time miner could not touch and make a living.

The average dredging ground in the vicinity of Oroville yields about 27c. per cu. yd., while the cost of mining is from 5 to 6c. There are, of course, rich and poor spots, but the figures given will cover the average.

The dredges working in the main river and its sloughs and branches are those against which complaint has been made by the river men. It is charged that they stirred up the gravel and sand, loosening it so that the floods in the springtime bring it down on farming land. On the other hand, the dredgemen claim that they bring nothing into the river which was not there before, and that in this system of mining the light soil and silt is covered by the rocks brought up from the lower gravel and thus held in position. The piles of gravel formed between the dredges are not as easily driven by a flood current as the alluvium on surface formed by natural wash; in fact, they cannot be driven at all, even under extraordinary circumstances.

The truth is that during the last winter there were seven overflows of the Feather river, caused by the extraordinarily heavy rains, and the unusual quantity of water caused more silt to be carried down the stream than had been the case for a number of years. The farmers, however, insist in attributing the extra damage to the dredges and are disposed to form a combination to sue the dredgemen and to ask assistance from the Anti-Débris Association. The dredgemen say that if it can be shown that their operations caused damage, they are willing to put up dams to prevent it or take any other reasonable measures. The machines which are working away from the river can do no possible harm, as they work in enclosed pits with no outlet to the river, and their tailings are confined by the continuous gravel dam built by the dredge in its operation. The Anti-Débris officials see a possibility of increased litigation and resultant fees, and there are, therefore, threatened injunctions against the dredgers.

To an observer it looks as though, with the increase in capacity of the machines and the enlargement of their field of work, it is quite possible that this comparatively new branch of the gold mining industry will soon surpass in annual results the older branches of drift and hydraulic mining combined. It is certain that the dredging work is making a market for lands which have hitherto been worthless for almost any purpose.

THE MINER'S INCH.

The method of measuring by inches originated in the early days of hydraulic mining. A number of States, California among the first, adopted the miner's inch system as a legal method of measurement. In the *California Journal of Technology* Mr. A. P. Stover summarizes, as follows, the number of inches assumed in different States to equal a flow of 1 cu. ft. per second.

Equivalent in:	By custom.	By statute.
California	50.0	40.0
Colorado	38.4	38.4
Montana	40.0	40.0
Idaho	50.0	...
Arizona	40.0	...
Nevada	50.0	...
Utah	50.0	...

Other differences exist. In Nevada the inch in one part of the State may be measured under 4-in. pressure, and in another part of the State under 6-in. or 12-in. pressure. Along the Humboldt river, water in some cases is measured under pressures of 2 ft., 3.5 ft. and even 4 ft. In practice, one of the difficulties in measuring water by the inch system is the maintaining of a constant head of the orifice, but this trouble is much reduced by the use of the Foote measuring box. The most serious fault of the system is that it is limited to the measurement of comparatively small volumes of water; 2 to 3 cu. ft. per second can be measured with ease, but to measure a flow of 600 ft. per second, as in a large canal, would require a 6-in. slot nearly 417 ft. long, something impracticable.

The great variety of marbles used for decorative purposes can be seen in a striking manner in the new Westminster Cathedral. Sixty specimens are represented there. In the crypt the columns are of red Norwegian granite, with capitals of Hopton Wood marble and Derbyshire marble bases. The 29 columns on either hand of the nave, with capitals of Carrara marble, are of *verde antico*, of Greek *cippolino* (white marble with green veins) from Eubœa, Swiss *cippolino* from Saillon in the Rhone valley, Italian breccia from Serevazza, gray granite from Norway, and red granite. These shafts, 13 ft. long, each stand on a base of Norwegian granite.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the columns of the ENGINEERING AND MINING JOURNAL.

TREATMENT CAPACITY AND ORE RESERVES.

The Editor:

Sir:—I confess to a good deal of disappointment at the meager discussion that Mr. H. C. Hoover's article on this subject has elicited. To my mind, it is, from its form of treatment, the most important on the generalities of mining engineering that we have seen for some time past.

It cannot be doubted that the clear understanding of any problem in the abstract assists materially in the mastery of each example in the concrete; and, though such abstract understanding may not be the *sine qua non* of grasping the concrete, those with the clearest understanding of the abstract suffer the least from mistakes in the concrete.

Notwithstanding the examples cited, Mr. Hoover's paper is one of generalities, and his broad generalizations, which crystallize into words, and perhaps a somewhat novel form, the practice of more than one engineer, can be only handled with safety under expert advice, being in this respect as dangerous in lay hands as a powerful drug.

As an instance, the temptation is almost irresistible for the superintendent, when his costs are cut down by the addition of a secondary plant, to lower the grade of his ore as well, by the inclusion of rock that would have been, but for the secondary plant, below treatment grade. This, however, upsets all the calculations upon which the secondary plant was authorized. To be sure, the condition of the mine may actually justify it, but unless that was recognized as among the factors of the problem, and allowed for when additions were under consideration, the property, with the increased output and with the increased capital outlay, due to the secondary plant, to pay interest upon, will actually be giving a less return per centum.

While the exact form of statement made by Mr. Hoover of the fundamentals of the problem is most striking, I am far from sure that the simple comparative method of statement of the case of the primary plant for a number of years, as against the primary plus the secondary for the same number of tons and years, is not simpler and less liable to error in calculation; at all events, the latter is the form in which the problem suggests itself most naturally, and on these lines the following table of coefficients has been prepared. It is assumed that current profits are transferred into interest-bearing deposits quarterly, and that the interest rate is 1 per cent per quarter. This would be quite compatible with common business arrangements. For any case of primary or primary and secondary plant let T. be the quarterly tonnage and P. the profit; P. T., then, is the quarterly profit from operations.

At the end of the first quarter the profits will be P. T.; at the end of the second quarter, P. T. plus 0.01 P. T. or 1.01 P. T.; and the total profit for the two quarters, 2.01 P. T. At the end of the third quarter the total profit will be 3.0301 P. T. In a word, the case is that of the amount of an annuity of 1 in *n* years, and by the formula for this (Kent, p. 15), the coefficients can be worked out. For the assumed case and for six years they are given below:

COEFFICIENTS OF P. T.

		GAIN. Quarterly.	Total.
3	Months	1.	1.
6	"	1.01	2.01
9	"	1.0201	3.0301
1	*Year*	1.0303	4.0604
3	Months	1.0406	5.1010
6	"	1.0510	6.1520
9	"	1.0615	7.2135
2	*Years*	1.0721	8.2856
3	Months	1.0829	9.3685
6	"	1.0937	10.4622
9	"	1.1046	11.5668
3	*Years*	1.1157	12.6825
3	Months	1.1268	13.8093
6	"	1.1381	14.9474
9	"	1.1495	16.0969
4	*Years*	1.1610	17.2579
3	Months	1.1726	18.4305
6	"	1.1843	19.6148
9	"	1.1961	20.8109
5	*Years*	1.2081	22.0190
3	Months	1.2202	23.2392
6	"	1.2324	24.4716
9	"	1.2447	25.7163
6	*Years*	1.2572	26.9735

The practical use of this is illustrated below for two extreme cases:

Primary Plant.

	Case 1.	Case 2.
Tonnage per quarter	7,500	7,500
Profit per ton	$1.00	$1.00
Quarterly profit (P. T.)	$7,500.00	$7,500.00
Fixed charges	.30	1.00
Primary and Secondary Plants.		
Tonnage per quarter	10,000	10,000
Profit per ton increased tonnage	$1.30	$2.00
Profit per ton on whole tonnage	1.075	1.25
Quarterly profit (P. T.)	10,750.00	12,500.00

Using the coefficients as above given and substituting the values of P. T., we get the following:

	Case 1 & 2, Primary.	Case 1. Primary & Secondary.	Case 2. Primary & Secondary.
Tons	60,000	.....	.....
Time	2 yrs.	1½ yrs.	1½ yrs.
Profit	$62,000	$66,000	$77,000
Plus interest for two quarters compounded.	.....	67,000	79,000
Gain over primary..	.....	5,000	17,000
Tons	90,000	.....	.....
Time	3 yrs.	2¼ yrs	2¼ yrs.
Profit	$95,000	$101,000	$117,000
Plus interest for three quarters compounded.	.....	104,000	131,000
Gain over primary..	.....	$9,000	$26,000
Tons	120,000	.....	.....
Time	4 yrs.	3 yrs.	3 yrs.
Profit	$129,000	$136,000	$159,000
Plus interest for four quarters compounded.	.....	143,000	165,000
Gain over primary..	.....	$14,000	$36,000

By this comparison of what may be a normal with an exceedingly abnormal case of fixed charges is clearly shown the important part this fixed charge item of Mr. Hoover's plays, a part so important as to call for the careful segregation of all such items in mine accounting, so that the ratio of plant to reserves may be readily and constantly canvassed, without the necessity of a special and laborious investigation. Mr. Hoover's separate items of gain are all included "automatically" in the figures 14,000 and 35,000 (120,000 tons and four years, Cases 1 and 2), thus, 10,000 tons per year for three years equals 30,000 tons, the increased tonnage per year, and fixed charges for the two cases would be $9,000 and $30,000 respectively, and the several interest items amount to, approximately, $5,000 and $6,000; so that fixed charge plays by far the most important part.

While going with Mr. Hoover in the foregoing to the full extent of his argument regarding the maximum permissible ore reserves, I do not care to accede unreservedly to the proposition that the "maximum" provided as above should also form the minimum. There are certain classes of deposits that from geological structure and occurrence can be reckoned on more definitely, within their limits, than the standard quartz vein; there are also conceivable cases where the additional security of the investment would seem to be too clearly bought by keeping a three or four years' reserve blocked out. Such would be the case of a mine with many small veins and heavy ground, where the additional charge for repairs and for interest on development would seriously impair the profits. With such particular cases in mind, the minimum proposition quoted does not appear so inevitable as the maximum, though it can be granted that in the majority of instances it affords a safe rule for practice.

R. GILMAN BROWN.

San Francisco, May 12, 1904.

THE FUTURE OF JOPLIN.

The Editor:

Sir.—In consequence of several years' residence in the Joplin district, I am much interested in what you have to say in your editorial columns under the title 'The Future of Joplin.' I wish to acknowledge the essentially fair spirit of your argument, but should like to call your attention to certain facts which you do not mention, but which may well be taken into account in making any forecast of the zinc ore production.

You recognize the stimulus to prospecting resulting from high ore prices, but it should be remembered that the benefits, so far as they affect ore tonnage, are necessarily deferred on account of the time required to explore and develop the new discoveries and bring them into production. Reference to the statistics of production furnishes an example: High prices in 1899 stimulated prospecting very greatly, but the benefits appear in the production for the year 1901, when the tonnage exceeded that of the boom year, 1899, whereas zinc ore prices averaged $14.33 per ton less.

During a period of 18 months, from July, 1900, to December, 1901, ore prices averaged only $24.66 per ton. In consequence of these low prices, scores of 'sheet ground' mines were shut down, but the zinc ore production was maintained by the mining of rich lenses, discovered by the prospecting of 1898 and 1899. During this period of low prices very little drill prospecting was done, and in some cases orebodies already discovered by drill were not developed on account of the unpromising condition of the ore market. The result, so far as it affects production, will naturally be felt somewhat later, probably in 1903.

A physical difficulty, due to increase of water in the mines, has had an important effect on production during 1902 and 1903. The year 1901 was one of the driest years in the history of the district, and during that summer and fall the ground-water was at a lower level than ever before known. The spring thaw of 1902 was followed by a period of heavy and long-continued rains. In a few weeks an increase in ground-water began to be felt throughout the district. Not only in the outlying camps. but even in sections well equipped with pumps, some mines were shut down for weeks because of inability to beat the water, and in many cases production was interrupted until land-owners and first lessees had enlarged their pump plants. In the spring of 1902 all the mines at Center Valley were drowned out, and, although they were partly unwatered during the succeeding sum-

mer, the fight against the water was given up in the fall, the mines abandoned and most of the mills were later moved away.

The two conditions, little prospecting in 1901 and strong water in 1902 and 1903, operated together to interfere with a normal increase of tonnage for 1903 and may easily account for more than the 10 per cent decline which statistics show.

It seems reasonable to believe that the district, under favorable conditions, is capable of great increase of yield.

W. SPENCER HUTCHINSON.

Boston, May 21, 1904.

MINING EDUCATION.

The Editor:

Sir.—What is the purpose of a mining school? It is, to state the matter briefly, to train and equip a young man in chemistry, physics, mathematics, materials, machinery, motors, geology, logic, literature, and especially in thought expression by means of words, drawings, and by doing things. The training, to be efficient, must become part of him and not of the learn-by-heart-and-forget-as-soon-as-examination-is-over kind. To gain this end, laboratories, in as many departments as possible, are the strongest aid. An idea communicated by book or lecture is abstract and not truly assimilated in its relation to the student or to engineering. A concrete fact obtained by experiment is part of the experience of the man, and not only clears up the relations of the particular fact experimented on, but those of a hundred others correlated to it.

Coming now to certain questions of detail which have been lately brought to the front:

A mining school in a city will receive pupils who know nothing of rocks, nothing of methods of excavation, and little even of machinery. The teacher has a clear field here, but he will find that he needs abundant laboratories and summer schools in mining districts with note-taking and criticism, to make good the absence of observation at the mines. His boys will be bright and keen, and will develop into good engineers if he does his work well.

A mining school in a mining district, where the pupils can take frequent excursions seems, at first sight, to do away with the need of laboratories, as the facilities for observations are so great. This is, however, not the case. The teacher will find great difficulty in preventing his students from becoming bigoted. They will learn their own district so well that they "know it all," and no other method can be right because not included in their experience. A laboratory with well-chosen apparatus will be a good antidote and will help the teacher to overcome this tendency.

Schools for engineers and for foremen should not be combined. The methods are different, and since the world will not take the trouble to inquire, the engineers will suffer loss of reputation from the lack of training of the foremen who come from the same school.

I early took the ground (1872) that one could introduce the student to the principles of fire metallurgy by smelting copper or lead in a small cupola furnace, and then find him in a sufficiently receptive and practical frame of mind to study intelligently the metallurgy of iron. I have not seen any reason to change my view, after watching many of my pupils come to the front rank among iron and steel engineers, as a result of the above training.

In regard to the size of apparatus, I prefer small size to large. There is nothing that can be taught in a school that cannot be just as well taught with the small size as with the large size machines and furnaces, with a decided gain in economy of space, cost of machines, cost of ores, in student's time and effort.

I am much interested to find that Mr. Louis has adopted nearly the same sizes that we have.

We find, after the first work of acquiring the principles of action and of adjustment of the machines has been attended to, that the most instructive work comes in the form of "account of stock" or of "series work." A complete account of stock, showing where and in what quantities the values have been saved, and, on the other hand, have been lost, gets the student right down to the very thing the most advanced and up-to-date mill-man has to do for best results. For example, see 'School Laboratory Work,' by R. H. Richards and C. E. Bugbee, *Transactions* American Institute of Mining Engineers, 1904.

Series work is quite as instructive and near to actual engineering experience. For example, suppose cyaniding a gold ore is under consideration. There may be three variables—time, strength of cyanide, correction for acidity. By varying one with the other two constants he gets his first series locating highest efficiency. He then in turn varies No. 2 and gets its series and No. 3 for a third series. He can then go back and put the three best values in and see if another complete set of three series is wanted or superfluous. This series work is brought in also with our little Washoe pans and along many other lines, always pointing out the way the practitioner must use to look for highest efficiency.

In all this kind of work large apparatus and large ore quantities add to the difficulty of gaining the end and give no adequate compensation for so doing.

Modern up-to-date methods, as a general thing, I prefer for laboratory use, but I do not think it wise to hinder a good lesson to a class of students by bondage to up-to-dateness. For example, nobody ever saw a copper water-jacket run in the manner we have adopted at our school. I presume this is the furnace, and I am the man that Mr. E. A. Weinberg refers to in his remarks on Mr. Jenkins' paper. He is evidently not familiar with our methods or results.

Our method is chosen for least unfinished product and simplest and best account of stock for brief runs of only a few hours. We have never seen the slightest indication that we are doing harm by our peculiarity; on the contrary, we are opening the eyes of the students to see the when, what and how of things. To suppose that every appliance in the hands of a good teacher must be up to date is foolish. A pupil so taught will think to-day is right and to-morrow is wrong, whereas the student who is not brought up in bondage to any one idea is adaptable to whatever comes.

In regard to a unit of size, Mr. Jenkins puts it at 1,000 lb., and Mr. Louis at 200 lb. weight for a test on all ores.

Our ore-dressing laboratory consists of two complete mills and a number of independent machines, each complete in itself. The students in their thesis work can treat ore in a mill (a) with rolls, screens, classifier, jigs and round table; they can select any sieve scale or classifier current scale they please and make their run; then dry, weigh, sample, assay and make a complete account of stock of the run, or they can make a run (b) by the latest, most modern, up-to-date California mill, consisting of stamps, amalgamated plate, Frue vanner, classifier, canvas table and steep finishing vanner.

If their mill work proves that other collateral work is needed, we have a variety of classifiers, two Wilfley tables, 4 ft. and 6 ft. long respectively, a new Wilfley slimer, hand magnets, power magnet, and we expect soon to have a static machine.

We have found it unwise to adopt one unit for all tests. For example, we treat 1,000 to 1,200 kg. when making a test in our 18-in. water-jacket furnace; we treat 300 to 400 kg. in our three-stamp battery with 225 lb. to the stamp, with amalgamated plate, Frue vanner, etc., and about the same with our screens, jigs, classifier and round table, 8 ft. in diameter. We treat 1.5 kg. of silver amalgamating ore in our little 7-in. Washoe pans, and about the same or less for chlorination and cyaniding of gold ores.

In our students' thesis work we seldom meet an ore the peculiarities of which cannot be met by our machines.

In February, 1873, when the new mining laboratory of the Massachusetts Institute of Technology had been in operation for a year and a half, I wrote "The aim of these laboratories is essentially to give to the student in mining and metallurgy a chance to study on a small scale the practical parts of his profession. We cannot, in a small laboratory, build a mine to timber, to work and to survey; we cannot make artificial quicksands and other impediments to mining. In short, we cannot study exploration; but we can study the mechanical preparation and the subsequent smelting of ores."

The laboratory having now been employed for teaching classes for 33 years, developing and improving every year, I may say that I find no reason for modifying that statement.

Our first summer school, with note-taking and criticism, was in 1871, and we have had one nearly every year since.

ROBERT H. RICHARDS.

Boston, May 15, 1904.

ROTARY INTERNAL SCREW CONVEYORS.

The Editor:

Sir:—In Mr. W. R. Ingalls' article on mechanical conveyors, in your issue of April 21, he fails to do entire justice to this type of conveyor. The statement that "material can only be fed at one end" is erroneous. The writer knows of one conveyor of this sort which has five inlets, receiving material discharged from as many furnaces. This type of conveyor may be costly, as Mr. Ingalls says, but such cost might be justified by advantages, under certain circumstances. As a cooling conveyor, it is remarkably successful where materials like cement clinker are to be conveyed and cooled simultaneously, without loss of objectionable dust into the atmosphere of a mill, where it can embarrass workmen. Material in a rotary conveyor can be cooled by drawing air through the conveyor tube, and the hot air can be utilized. Also water can be sprinkled on the conveyor's exterior, where the nature of the material does not allow direct contact with water.

MORRIS M. GREEN.

Boulder, Colo., May 12, 1904.

SILICIOUS SEGREGATIONS.

The Editor:

Sir:—In Alaska we are particularly interested in rock segregations, since many large mineral bodies here are of this type, rather than of the fissure vein extreme, and important placer areas owe their gold to quartz segregations. The only general inference which seems plausible is that these segregations, even when not truly igneous, are formed at depths, or under conditions of pressure and temperature, which are not consistent with the formation and maintenance of fissures, or even of cavities in the generally understood sense.

We can only surmise what happens at the very great depths. Many geologists, although, of course, accepting the general statement that the interior of the earth is mainly plastic, or more or less solid, are very much inclined to account for the variations in eruptive rocks by a theory which does not take cognizance of any other than liquid matter. Thus Mr. W. H. Weed, in discussing in your columns (March 31, 1904) an allied subject, 'Free Gold in Basic Igneous Rocks,' apparently supports this view. The idea stated simply, is that a wholly liquid silicate magma may separate into more acid and more basic silicate portions, just as a silicate is separated from a sulphide at the smelter. It is hard to discard such a simple explanation in favor of a more complex one. The one stated above is, however, not only opposed to all chemical theory and laboratory experience, but when we consider that the liquid magma must in any case be contained in comparatively small reservoirs in the more solid matrix, the liquid differentiation theory becomes superfluous, because the most easy and usual separation processes of the chemical laboratory, such as fractional crystallizations, filtration, etc., come into play with the changes of temperature and pressure which must inevitably occur.

The segregations of most importance are probably those formed at lesser depths. Although the 1901 *Geological Report* of the Nome region states that some few gneissoid rocks probably owe their structure to original crystallization, your correspondent, Mr. Robert Stevenson, has not, apparently, appreciated the general tenor of the report, which describes most of the metamorphic phenomena on the assumption of the principles laid down by the British geologists long ago. These principles, which attribute the changes from sedimentary, or igneous, to metamorphic rocks to high pressure, moderate temperature and some moisture—conditions which can easily be conceived as being at present in force over large areas—must have some flaw found in them before any such complexities as those proposed by your correspondent can be admitted.

Mr. Stevenson urges the necessity of a means of distinguishing original from altered foliated rocks. Such means do exist; original gneisses show more perfect crystals than those derived by alteration, and the presence or absence of strain in microscopic sections is also, to some extent, a guide. Geologists are, however, perhaps too ready to lay all want of homogeneity to alteration processes, when the rock shows any evidence of metamorphism.

From banded structure in gneisses and schists to silicious segregations is but a step, and it is hard to see any reason why the same classifications should not apply. The idea that these segregations are generally due to veins which existed before the period of alteration will not hold in Alaska. An explanation which conforms better to observation is that, before or after complete solidification has taken place, the folding or folding strains produce cavities or series of cavities, instead of the more complete fissures formed at less profound depths. Milling, caving and replacement actions then occur, and isolated deposits or series of deposits having no free walls or connecting streaks are the result. This theory does not conflict with Van Hise's and Hoskins' conceptions[1] if we consider the cavities to have been primarily filled with fluid matter at a sufficiently higher pressure to prevent caving. This condition seems to me to be perfectly consistent when the igneous or semi-igneous conditions are appreciated.

BLAMEY STEVENS.

Valdez, Alaska, April 25, 1904.

SMELTING OF RAW SULPHIDE ORES AT DUCKTOWN.

The Editor:

Sir:—In response to your request to supplement my contribution upon this subject, I take pleasure in stating that the experimental work of the Ducktown Sulphur, Copper & Iron Company, Ltd., carried on at intervals, for several years past, was concluded by the test campaign, the detailed data of which appeared in your issue of May 2, 1903. Following that, the last of its stock of roasted ore was cleaned up towards the end of September, 1903, and since then its whole furnace plant has run exclusively and constantly on raw ore. Almost 70,000 tons of raw ore have been smelted in the past seven months, with less trouble and interruption than records show for any similar period and tonnage on roasted ore.

The conditions and results of the commercial practice tally so closely with those of the experimental campaign as to confirm and verify (literally) the data already published. The only important modifications of that data are: A very material gain in furnace's capacity; the use of slag on the charge has been entirely discarded; and a heavier blast is used.

Furnace Capacity.—Referring to this feature in my original article, it will be noticed that a loss of efficiency of 48 per cent was shown on furnace's performance on raw ore, as compared with roasted ore. The same furnace is now averaging 110 tons of raw ore per day; deducting the time necessary to re-concentrate the matte from 'first operation' gives an average capacity (including both operations) of 96 tons raw ore per day, or a loss of efficiency of only 16.5 per cent instead of the 48 per cent originally quoted.

Preparations are being made to further increase the blast, which, when completed will still further increase the furnace tonnage.

Opinions of the Process.—Considerable interest in the Ducktown Sulphur, Copper & Iron Company's practice having been expressed by others, the following may be quoted from the *Boston News Bureau* of November 16, 1903, as Mr. J. Parke Channing has had numerous opportunities of seeing and studying the operations: "According to President Channing of the Tennessee Copper Company, Mr. Freeland has admirably succeeded in these experiments, and his plant is now running entirely on raw ore, and making both a technical and commercial success. It is solely as a result of his successful experiments that the Tennessee Copper Company decided to adopt the same methods."

Comparative Economy of the Process.—The plant and equipment of the Ducktown Sulphur, Copper & Iron Company is not of modern design, yet under its conditions a reduction of 3.018c. in the cost per pound of copper is effected by raw sulphide smelting. The writer is of the opinion that an up-to-date plant should make an even better showing, and it is to be hoped that our immediate neighbors, the Tennessee Copper Company, with their admirable plant will confirm that opinion in the near future, as that company is now making preparations to adopt the same methods.

W. H. FREELAND.

Isabella, Tenn., May 2, 1904.

MINE ACCIDENTS AND THE LAW.

The Editor:

Sir:—I notice, with approval, the concluding paragraph of the editorial on 'Coal Dust as a Factor in Mine Explosions.' With regard to protection against mine accidents, I have always agreed with the opinion expressed by the late R. P. Rothwell, which was based on practical experience and on long and careful study of the causes of accidents in coal mines. He held that the regulation of mining by law had been overdone, and that many of our State laws were so framed that they really protected the mine operator rather than the miner. His belief was that the miner's best safeguard would lie in a law holding the mine operator strictly responsible for damages in all cases of injury to life and limb, and putting in all cases the burden of proof upon the operator.

There is no doubt that in numerous cases the mine operator escapes responsiblity, either wholly or in part, by showing that he has complied with the letter of the law, and that his mine was therefore technically safe, and had met with the approval of the authorities. The natural result would be that the accident must be due to contributory negligence, and that, therefore, the sufferer was not entitled to damages. Under the provisions of such a law as is briefly outlined above, the occurrence of an accident would be, in itself, proof that the mine was not in proper condition. The mine owner, or operator, would then be required to prove that his property was in good condition and provided with all proper appliances. Such proof must necessarily be conclusive to be accepted by the average jury, which is naturally inclined to sympathize with the plaintiff rather than with the defendant in a damage suit. It would take very brief experience to convince mine managers that the best and cheapest course would be to take every precaution against accident, and to provide their mines with proper ventilation and to make suitable regulations. This spur of self-interest would, in the very great majority of cases, be far more effectual than the provisions of the law, which are too often complied with in a half-hearted and perfunctory way. The mine owner is very apt to do just as much as the law requires, and no more, and to indulge in the widest interpretation of its provisions which an inspector will permit; with the certainty that he would have to pay heavy damages, the case would doubtless be much improved.

I do not mean to say that there are no managers who take a more liberal view; undoubtedly, there is a number who desire to have their mines safe and in good condition; but

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1'Principles of North American Pre-Cambrian Geology'; in *Sixteenth Annual Report*, United States Geological Survey.

there are too many with whom the pocket is a stronger motive than conscience, and it is the latter class who would be reached under the plan outlined above. At least, it is worth careful consideration.

INVESTOR.

New York, May 17, 1904.

LABOR CONDITIONS IN COLORADO.

The letter which is given below appeared in the New York *Evening Post* of May 18, and is a timely protest against certain articles which have recently appeared in the press:

One would think from some of the articles that are appearing in Eastern papers and magazines these days that all of Colorado has been turned into a military camp, all business was suspended, and everything was passing into a generally demoralized condition. It is unfortunate that magazine articles have been written with such superficial knowledge of the condition of affairs here, and that correspondents have too often listened so exclusively to the talk of a few labor leaders who are trying to explain their mistakes by misleading and one-sided statements. Without doubt, there have been perplexing, not to say serious, labor troubles at a few points in the State, notably Cripple Creek and Telluride; but there are scores of places, large and small, where there has been no trouble whatever.

The facts are that the Western Federation of Miners, which is largely made up of skilful and valuable miners, came most unfortunately under the control of exceptionally bad leadership, and is to-day suffering from the results of that leadership. Mr. Moyer, its president, is locked up at Trinidad for desecrating the flag with rabid socialistic utterances, and an attempt was made to release him by habeas corpus proceedings. He was brought to Denver by order of the Supreme Court, which doubted its jurisdiction in the case, as Telluride, where he was imprisoned, is under martial law. He was accordingly taken back and locked up again. When he reached Denver in charge of a small squad of soldiers, the secretary of the union, who is regarded as much the more dangerous of the two men, disregarding the request of the officers in charge, undertook to talk with Mr. Moyer, and when held back from his attempt struck a soldier full in the face, and was severely handled and turned over to the civil authorities and locked up in the city jail with the decided approval of all parties. There was no "riot" or anything approximating one. The only persons who knew of it at the time were the few people at the station.

There always comes into a State like Colorado in its early days a rough element, that hangs about the mining camps ready to foster trouble, and this element came to the front in these two or three localities for a short time only. The Governor promptly and wisely took strong and effective steps, so that a victory for law and order has been won which has resulted in much better conditions than those which exist in many other States. The troops have now been taken from Cripple Creek, the camp has come back to its old-time production of gold, and things are as quiet there as in any well-ordered community. But what is best of all, union and non-union men are working there, and the mine owners are conducting their own business without the interference of a lawless element, which has found itself out of place in the State. From this time forth equal rights will be accorded to all men who are willing to earn an honest living and pay attention to their own business. The victory has been one for law and order, and is of inestimable value to employers and employees alike. In the meantime Mr. Moyer and Mr. Hayward are being discredited by all parties and have about run their course in Colorado, as has been the case with them in at least two other States.

In southern Colorado the strike in the coal mines was practically broken 6 days ago, and here, too, union and non-union men are at work, and all the mines are producing as usual, the price of coal being as low as it ever was.

The coming of Mr. Gould and Mr. Rockefeller into the State with their purchase of the Rio Grande and Midland Railway systems and also the great steel plant of the Colorado Fuel & Iron Company has brought great stability to the large business enterprise in the State. The wise and strong action of the Governor, backed by the best business men of the State, has brought about a state of affairs that will be of inestimable value to Colorado for long years to come, and will be of great service to both laboring men and employers alike. The open shop and the open mining camp have come to stay, and the lawless element has found that it has no place there. It is altogether looked upon as a much wiser and more permanent settlement of affairs than the one which came in Pennsylvania.

Colorado itself is developing into a commonwealth of character and intellectual forcefulness. A new set of young men is coming into the affairs of the State and are determined that political corruption and political corrupters shall be driven out of power. It is significant that one of our Congressmen, when he found that his election, which had a narrow margin of votes, was brought about by fraud, resigned his seat of his own accord; a thing that has never happened from any other State, although the method of his election is not exceptional in the history of the country. The State is largely made up of Eastern men and women, as the effective schools and churches indicate. This is the college town of the Rocky Mountain country, and it is the graduates of this institution that are more and more giving character and standing to the best leadership in all this region.

It is necessary for one who wishes to write a magazine article in regard to Colorado at the present time to get hold of the underlying facts and trend of its life and history. It is unfortunate that the men who have recently written have had only the more superficial facts and have given impressions that are misleading in regard to actual conditions and the development of the State which is making constantly for the best in its intellectual and moral life as well as its business affairs. Without doubt, the State is passing through a political and industrial transition, but the changes are making for a more stable and better condition of affairs throughout the whole commonwealth.

DUTIES ON PETROLEUM IN COSTA RICA.—United States Consul John C. Caldwell reports that the duty on refined petroleum imported in Costa Rica is advanced from 16.5 to 30 centavos—13.9c.—per kilogram. The duty on calcium carbide has been increased from 6 to 14 centavos—6.5c.—per kilogram.

LAKE SUPERIOR TRAFFIC.

The report of the superintendent in charge of the Sault Ste. Marie canal, for the year 1903, gives some idea of the enormous traffic carried on the Great Lakes. From this report it appears that during the last season the American canal was open for 249 days and the Canadian canal 256 days. Of the total traffic passing the Sault about 80 per cent went through the American canal, and the remainder through the Canadian locks. The following table gives some particulars of the traffic passing the Sault, which is approximately the traffic of Lake Superior:

	1902.	1903.	Changes.
Vessels passed..	22,659	18,596 D.	4,063
Tons of freight carried	35,961,146	34,674,437 D.	1,286,709
Value of freight.	$358,306,300	$349,405,014 D.	$8,901,286
Freight charges.	26,566,189	26,727,735 I.	161,546
Average haul....	827.4 miles.	835.6 miles. I.	8.2 miles.
Av. rate per ton-mile	0.089c.	0.092c. I.	0.003c.

The total freight traffic of 34,074,437 net tons for the season of 1903 when compared with the season of 1902, the maximum in the history of the canal, shows a decrease of 4 per cent, or 1,286,709 tons; but in comparison with the previous maximum year, that of 1901, this year's traffic shows a gain of 6,271,372 tons, or 22 per cent. The items showing an increase are coal, grain and salt. The falling off in the movement of iron ore largely accounts for the decrease in the total traffic.

The following table will prove interesting as showing the distribution to other lakes of freight bound eastward from Lake Superior and also the district from which freight bound to Lake Superior originated:

Eastbound from Lake Superior ports to—	
Lake Michigan ports.....	3,210,674
Lake Huron ports.....	1,155,377
Lake Erie ports.....	22,212,177
Lake Ontario ports.....	354,010
Total tons.....	26,932,238
Westbound to Lake Superior ports from—	
Lake Michigan ports.....	90,631
Lake Huron ports.....	226,047
Lake Erie ports.....	7,329,727
Lake Ontario ports.....	96,394
Total tons.....	7,742,199

Iron ore formed 26.8 per cent of the total traffic in value; coal, 7.1 per cent; copper, 7.4 per cent in value.

The growth in size of lake vessels is shown by the statement that 97 registered boats using the canal last year were over 400 ft. in length; 175 were between 300 and 400 ft.; 314 between 200 and 300 ft.; 227 between 100 and 200 ft. and 82 of less than 100 ft. in length. The maximum traffic for a single day during the season was on August 31, when 151 vessels, carrying 295,782 tons of freight, were passed through the canal. The steamer *John W. Gates*, of the Pittsburg Steamship Company's fleet, is credited with having moved the largest quantity of freight through the canal during the season, 164,763 tons. This is somewhat lower than the record for 1902, when the *William Edenborn* carried 183,270 tons in all. The *Edenborn* in 1903 carried the largest single cargo, 8,914 tons of iron ore.

The total number of lockages for the season was 11,642, and the total number of vessels past was 18,596. Of these passages 2,461 were by small vessels under 100 tons register.

The mineral freight for the season included 6,937,633 tons of coal, 21,654,898 tons of iron ore, 193,267 tons of pig and manufactured iron, 112,877 tons of copper, 21,300 tons of building stone and 454,882 bbl. of salt.

THE GLOBE DISTRICT, ARIZONA.

EDITORIAL CORRESPODENCE.

The rebuilding of the Old Dominion smelter is the most important event in the recent history of the Globe district. With the adoption of matting and converting in the place of oxide smelting, it assures a greater economy in future operations, and, furthermore, it should enlarge the scope of the mining industry generally, inasmuch as the stores of sulphide ore, heretofore neglected, will become available for treatment.

For a number of years past Globe has been conspicuous as the only important camp in the Southwest which utilized oxidized ores exclusively and turned out its product in the form of copper bars made by a single fusion. The United Verde mines began the treatment of sulphides early in their career. At Bisbee the Copper Queen installed converters in 1894, and three years later the Arizona and Detroit

SMELTER AND MINES OF THE OLD DOMINION COPPER COMPANY.

companies at Clifton were producing copper by the bessemer process. The Old Dominion, however, continued making black copper from oxides down to 1902, a course that has naturally restricted mining development throughout the district. With expensive fuel—a poor grade of coke costing $10 or more a ton—and a heavy loss of copper in the slags, due to the silicious character of the ore, it is evident, also, that this method of smelting was burdened with great disadvantages.

The Old Dominion is one of the representative mines of Arizona. It has a record, during the 20 years of its intermittent activity, of over 120,000,000 lb. copper, and there is promise of a long career ahead. The ore-bodies that have been worked are both large and high grade. In the last two years of operation, when treating oxides alone, the average tenor of the furnace charge was nearly 8 per cent copper, although the burden included 45 per cent lean iron ore as flux. There is still a good supply of high-grade ore in the mine and a much larger quantity of material developed during the exploitation of the rich oxides that can be made available by concentration.

The principal ore-zone as exposed in the Old Dominion workings occurs along a displacement that strikes northeast and southwest and has a steep dip southeast. The hanging wall consists of limestones and quartzites, which are assigned by Ransome[1] to the early Paleozoic, while the foot-wall is diabase of more recent origin. The faulting seems to have occurred both before and after the intrusion of the diabase. Most of the ore so far has been taken from the region of the hanging wall, where it occurs in rudely lenticular bodies lying nearly parallel to the bedding of the enclosing limestones and quartzites. The ore favors especially the contacts between the different rocks, though not infrequently it is surrounded completely by limestones. One of the largest lenses that has been found was opened on the second level along the bedding plane separating the limestone and the underlying quartzite; it is said to have measured 200 ft. in length, 100 ft. in width, with a thickness of 60 ft.

The oxidized ores, which until recently were alone exploited, consist mostly of cuprite in a gangue of iron oxides and quartz. Masses of malachite and chrysocolla are intermixed with this ore, and in some parts of the mine there are large bodies of specular hematite carrying only a small percentage of copper.

The occurrence of sulphides, which is essential to the successful issue of the present scheme of metallurgical treatment, has been established by exploration in the lower workings. These ores begin to appear on the 5th level at a depth of 350 ft. and on the 11th and 12th levels they are in force. Pyrite and chalcocite are the most prominent minerals, the latter, as might be expected, being found in the transition zone below the oxides where it has probably been deposited by process of secondary concentration. The pyrite occurs in a different type of deposits than the oxidized ores above. It is confined mostly to irregular veins in diabase which form two well-defined lodes. The gangue is mostly quartz of friable nature. Very little chalcopyrite can be observed with the pyrite, but no doubt it is present and carries most of the copper. The tenor of the pyritic ore usually exceeds three per cent; a portion can be smelted directly and the remainder is well adapted to concentration.

In carrying out its new plan of development the company has provided for a more active campaign than was possible under former conditions. The old shaft near the south end of the workings was partially disabled by movements of the ground due to caving, and hence could not be relied upon to furnish the necessary capacity for hoisting when work was under full headway. As a substitute, a new shaft has been driven at a point further north and on the foot-wall where there is no danger of subsidence. It is a vertical, five-compartment shaft, measuring 24 by 6 ft. in section, and has a steel head-frame 76 ft. high. The hoist is a direct-acting Nordberg, 20 by 60 in., equipped with steam brakes and steam reversing motion. The shaft is down to the 10th level and will soon be in communication with the 12th, now the bottom level.

A small flow of water has to be handled in the mines, but this will eventually prove an advantage rather than otherwise, as it can be used in the mill which is to be added to the company's plant. Most of the water enters on the 9th level, and a single pumping plant which is to be installed on the level below will dispose of the entire flow.

While the new smelter is under construction the old plant has been pressed into service, and two furnaces are now making bessemer matte which is converted in a temporary stand. The ore is obtained from the Old Dominion and United Globe mines, but about two car-loads are exchanged daily with the same quantity of Copper Queen ores which are needed for their iron and sulphur. The necessity for this arrangement will cease when the company begins concentrating its sulphides.

The smelting works are being erected in proximity to the old plant, some distance south of the main shaft, with which they are connected by a railway. The main building is of steel construction, measuring 115 ft. long by 30 ft. wide, with a bullion and re-lining shed attached, of the same length. It is to be equipped with three furnaces, 44 by 180 in. at tuyeres, and two stands of converters. The furnaces are arranged in tandem with settlers between and can be tapped from either end, so as to run the matte from two furnaces into one settler. They will be charged automatically from the cars. A 40-ton traveling crane has been set up for handling the converters. The dust chamber in the rear of the furnace building is of steel and brick construction, designed to handle easily 50,000 cu. ft. of free air per minute.

The increased demands for power have necessitated the erection of a new steel powerhouse near the smelter; it will supply about 1,100 h. p. from four oil-fired generators. The mill, to be erected on a site adjacent to the main shaft, will have a capacity of 300 tons per day, and will concentrate the low-grade sulphides so as to obtain a product suitable for mixing with the oxidized ores.

With the new works under full headway, the company should be in position to double its present output, turning out over 20,000,000 lb. of copper per year. It is expected that the smelter will be blown in early in the coming summer.

The United Globe mines comprise a large number of properties that were consolidated under their present title in 1892, and have since been active producers. Through the Hoosier and Grey mines the company has explored the continuation of the Old Dominion fault for a long distance on the strike, finding so far as the workings have been extended in depth, practically the same geological conditions that characterize the rich ore-bodies to the southwest. At present the Hoosier shaft, which is bottomed at 600 ft., is closed down, and most of the development is being done from the Grey shaft. This has been driven on the foot-wall of the fissure through diabase and infolded masses of limestone and quart-

[1]'Geology of the Globe Copper District, Arizona.' By F. L. Ransome. United States Geological Survey; *Professional Paper* No. 12. Washington, 1903.

zite; a depth of 980 ft. has been attained in a winze below the shaft, the lowest point of development yet reached in the district.

A good deal of ore has been raised from the Grey shaft and from the Cuprite shaft, which is on the same ore zone but further northeast. In the workings near the surface the ore occurs as irregular masses in the limestone of the foot-wall, and is oxidized, while below it is found in stringers and veins that intersect the diabase, changing here to sulphides.

The old Buffalo mine, worked in the early days for its silver ores, lies on the side of a prominent ridge just west of the Grey, and still higher up is the Josh Billings; both mines are opened on faulted fissures which parallel the Old Dominion displacement. The Buffalo workings consist of two adits driven into the side-hill and following the fault for half a mile. The upper level has yielded most of the ore, in the form of cuprite and malachite occurring as replacements in the quartzite and limestone, as the diabase encountered in the second adit shows little mineralization. It is interesting to note that chalcocite is found in the first level within 100 ft. of the surface, although usually it begins to appear only near the lower limit of the oxides, at a depth of several hundred feet. The Josh Billings orebody is a fissure vein in quartzite and diabase, but, in contrast with the Buffalo, the richest portion is associated with the diabase.

The Big Johnnie mine lies outside the limits of the mineralized region just described, being about two miles north of the Grey shaft on the slope of Black peak, a cone-shaped mountain capped with diabase. The ores are oxides and carbonates filling the spaces in a brecciated quartzite. The crushed material occurs on a line of fissuring and has an average width of 2 ft. Work has been carried on through adits and open-cuts; the deposit has yielded a quantity of good ore and preparations are under way to extend the exploration by means of a shaft, which has a present depth of 125 ft.

The Gaylord-Globe properties join the Old Dominion and United Globe mines on the north. They cover four known veins or mineralized fissures, including the extensions of the Buffalo and Josh Billings owned by the United Globe Company. They are not active producers as yet. The Buffalo fissure has been explored to a depth of a little more than 200 ft., and some ore has been found which carries from 10 to 15 per cent of copper in the form of oxides intermixed with limonite and hematite.

East of the United Globe mines is the Copper hill group owned by the Arizona Commercial Company. A shaft has been sunk recently on one of the properties and is now down 620 ft. At the surface the ore occurs in a quartzite breccia, but it is said that the workings pass into diabase at shallow depth. The company has shipped some ore to the Old Dominion smelter.

Northwest of the town of Globe there are a number of mines which are capable, under favorable conditions, of adding materially to the output of the district, although as yet they have not been extensively worked. In some cases the silicious character of the ores has been a drawback to their successful operation, since the ores produced elsewhere in the district do not carry a sufficient percentage of bases to afford a good mixture for smelting. The Black Warrior Copper Company has undertaken to treat these ores by leaching with sulphuric acid and has erected works for this purpose as well as a complete plant for making the acid. At present the works are closed down.

At the Montgomery mine, owned by the Black Warrior Company, the ore is soft chrysocolla which constitutes the filling of a dacite tuff. The mineralized portion is about 50 ft. thick, and the ore seldom carries more than 5 per cent copper. The Geneva mine of the United Globe Company in the same locality shows similar geological relations.

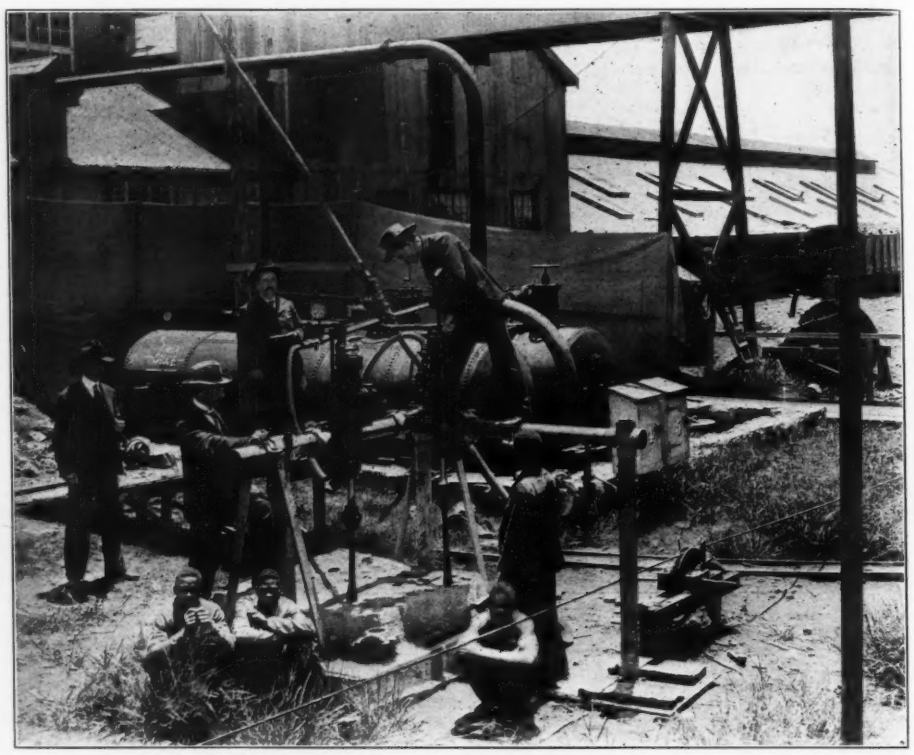
One of the most interesting mines in this region is the Keystone, some 8 miles west from Globe. The ore is chrysocolla of a uniform and beautiful bluish-green color occurring in a sheared granite. The vein, so far as explored, is persistent, averaging about 18 in. wide; it has been opened by three drifts, which follow the strike for several hundred feet. The rock on either side is more or less mineralized by stringers that branch off from the vein. Small quantities of carbonates are met with, and occasionally chalcocite and pyrite have been noticed. The high-grade ore carries from 20 to 30 per cent copper and is shipped to outside smelters.

The present situation in the Globe district gives encouragement to the view that the mining industry will soon enter upon an era of greater activity than it has known in the past. The output of copper within the next two years will probably reach 25,000,000 lb. annually, and there is reason to believe that this rate can be maintained for a long period to come.

X-RAYS AND PEARLS.—According to the London *Engineer*, by means of the X-rays it is easy, in spite of the non-transparency of the shell, to locate pearls in pearl oysters without opening the shell or injuring the mollusc in any way. The process is now employed in the Ceylon pearl fishery, saving much time, and preventing the unnecessary waste and thinning of the beds, hitherto unavoidable.

ROCK DRILL TESTS.

In the JOURNAL for May 12, page 768, we published an account of some interesting rock drill tests recently made at Johannesburg, in the Transvaal. Since that time we have received, through the courtesy of Mr. G. A. Watson, of Johannesburg, a photograph taken in the course of those tests, which is reproduced herewith. The illustration shows in a very striking way the arrangement of the drills and indicates the methods pursued in these tests.



A DRILL TEST ON THE WITWATERSRAND.

ACTION OF SILICON ON WATER.—The action of silicon upon water at a temperature near 100° C. formed the subject of a communication to the Paris Academy of Sciences lately by M. H. Moissan and F. Siemens. By the prolonged action of water at about 95° C. upon silicon, either crystalline or amorphous, a small quantity of hydrogen is evolved, and each particle of silicon is surrounded by a coating of hydrated silica. This effect was shown to be due to the minute amount of alkali dissolved from the glass, since it was stopped by the presence of a small quantity of acid, and no such effect could be observed in vessels of platinum or of fused silica.

MINERAL IMPORTS AND EXPORTS OF SPAIN.—Imports of fuel into Spain for the three months ending March 31 were 576,205 metric tons of coal and 45,887 tons of coke. The exports of minerals for the three months are reported by the *Revista Minera* as follows: in metric tons:

	1903.	1904.	Changes.
Iron ore	1,875,762	1,682,064	D. 193,698
Copper ore	229,447	247,145	I. 17,698
Zinc ore	35,264	29,599	D. 5,665
Lead ore	654	1,831	I. 1,17-
Pyrites	126,874	99,906	D. 26,968
Salt	57,098	81,025	I. 23,927

Exports of metals included 9,074 tons of pig iron, against 11,117 tons in 1903; 5,720 tons of copper, against 7,819 tons; 314 tons spelter, against 309 tons; 44,173 tons of lead, against 35,447 tons last year.

MINERAL RESOURCES OF THE UINTA MOUNTAINS.

By CHARLES P. BERKEY.

The southern flanks of the Uinta mountains and the Duchesne river valley, in northeastern Utah, have been for many years included in an Indian reservation. All kinds of natural resources have been pretty effectually kept from the close scrutiny of the prospector and investor, although numerous extravagant traditions of immense mineral wealth have been current for a generation. The very fact of inaccessibility has no doubt kept some of these stories alive much beyond their time.

In October of this year, however, the Uinta reservation is to be thrown open to settlement. Many mining men are looking forward to that time. In the face of this fact it may be well to take an inventory of the present state of geological knowledge of this district, and form some reasonable conclusions as to its possibilities.

The United States Geological Exploration of the 40th parallel covered this district, and the geological description in these volumes is by Clarence King. About the same time, in the seventies, Major Powell issued the 'Geology of the Eastern Uinta Mountains.' The most recent account is by Mr. Geo. H. Eldridge, who has made a study of the asphaltum deposits in particular. His report is published in the *Twenty-second Annual Report,* United States Geological Survey, Part I, 1900-1901. A rather intimate personal knowledge of certain typical areas and problems in this field has led me to summarize the main facts from all sources, including my own experience.

The Uinta range extends from the Wasatch region eastward across northern Utah into Colorado. The rocks of the main range are all sedimentary, and form a very gentle fold, with occasional fault-zones and often extremely rugged outlines, due to erosion processes. Some of the peaks exceed 13,000 ft. The base of the sedimentary series is a great sandstone and quartzite bed, estimated by all observers at more than 10,000 ft. in thickness. The tops of the chief mountains, as well as the core of the range, are of this material. The age of this quartzite was given as Carboniferous by King, although almost all other observers have questioned that interpretation. It may be very much older. But in any event there is a great thickness of sediments succeeding the quartzite continuously upon the flanks of the mountains, ranging in age from the Carboniferous to the close of the Eocene. The earlier sediments form comparatively narrow strips along the foothills, the later ones fill the whole valley of the Duchesne with nearly horizontal beds. All these follow each other with great monotony and, except at two horizons, with almost perfect conformity from the early Paleozoic into the Tertiary. The total thickness of these sediments reaches a maximum of 27,000 ft.

The most important beds for identification and correlation in the field are:

1. The quartzite core.

2. A heavy gray compact limestone 1,000 to 2,000 ft. thick, lapping well upon the flanks of the range, and carrying in its upper horizons many fossil corals and other forms—Carboniferous.

3. A coarse, cross-bedded red sandstone 1,000 ft. thick, of Triassic age.

4. Brilliant purple, and red, and green shales of Jurassic age, low on the flanks of the range.

5. Thick, heavy, almost horizontal yellow sandstones filling the Duchesne valley—Eocene.

Almost the only irregularities are due to the faulting along the strike of the range, and to the overlap of the later Eocene deposits upon the eroded edges of earlier beds skirting the margins of the valley. Occasionally, indeed, nearly all of the intermediate formations are in this way completely hidden. In every way the structure and succession are easily followed.

The mineral resources of the mountain district are at best very limited. There are few veins. Mineralization is meager. The streams are almost barren of concentrates of any kind. Occasionally a fault-zone is charged with pyrite. Some shale beds also carry iron sulphides plentifully. Weathered surfaces sometimes exhibit an iron capping that might look more encouraging than the facts usually support. Altogether one seldom sees a large mountain range present so sparing evidence of the presence of the metals.

In the Cretaceous beds, along the flanks of the mountains, and sometimes even covered by the later sediments of the Duchesne basin, are several seams of coal. There are seven seams in one area, and at least one of them is over 6 ft. thick. In the field this has the look of a fairly good quality. I know of no tests yet made upon it. These coal seams may prove of considerable value in certain parts of the district. They may even extend beneath the whole basin to the south. Coal is now mined on the southern margin, beyond the boundaries of the reservation at similar horizons.

The richest mineral resource of the reservation as is now known, is in hydro-carbons. Some of the rare hydro-carbon varieties, such as ozokerite, elaterite, gilsonite, and wurtzilite occur here. Tar springs are also known, and would seem to favor the idea that there are still great reservoirs of the mother substance covered up under the Eocene formations. All of the known occurrences are in fissures in these later beds. Occasionally a bed is so saturated with bitumen as to be called an asphaltic lime. All these substances are coming into demand as their uses become more clearly known. This district is particularly well supplied with some of these minerals. That they have all come originally from deep seated reservoirs of mineral oils, is the opinion of most geologists, but whether these reservoirs still exist and can be exploited no one knows.

[In regard to the geological age of the Uinta quartzite Mr. S. F. Emmons in a recent paper entitled 'Orographic Movements in the Rocky Mountains', *Bulletin,* Geological Society of America, Vol. I, p. 258, says: "In my study of the Uinta range in 1871 I found only upper Carboniferous beds, as determined by their fauna and their lithological correspondence with already defined horizons in the adjoining Wasatch range, and considered that the great thickness of quartzites, conglomerates and shales underlying them in apparent conformity and forming the core of the range belonged to the silicious or middle member of the Carboniferous. Powell, however, having found, in the cañon of the Green river at the eastern end of the mountains, an unconformity by erosion between the upper and lower portion of these sandstones, I assumed that the lower portion, the Uinta sandstones, must correspond to the Cambrian quartzites of Big Cottonwood cañon (Fortieth Parallel Reports, Vol. II, p. 199). In his later examination of the Big Cottonwood section, Mr. Walcott found lower and middle Cambrian faunas in the upper 2,000 ft. of the Big Cottonwood quartzites, and classed the lower 10,000 ft. as Algonkian. According to this classification, the Uinta sandstones would probably be of Algonkian age, but of a later period than the Red Creek quartzites." This question is also referred to by Mr. J. M. Boutwell in the last economic bulletin of the United States Geological Survey. *Bulletin* No. 225, p. 223.—EDITOR.]

AMALGAMATION ON THE RAND.*

By I. ROSKELLEY.

Inside amalgamation, pure and simple, is now not often seen on the Rand, but it is still the custom to feed mercury into the mortar-boxes. The advocates of this method say that the mercury from the mortar which passes through the screens helps to keep the plates in good condition, and that a small percentage of gold is caught inside. If plates are dressed properly every four hours, this continual application is unnecessary, and there are several objections to the practice. These are:

1. Excessive loss of mercury. Much of the mercury is 'floured' by the beating of the stamps, and passes through the screen in this finely divided condition. Floured mercury floats readily on water, so that little assistance is given to the plates, but much mercury is carried down the plates and escapes to the cyanide works and is lost. I find the loss of mercury with outside amalgamation is 0.3 oz. per oz. of gold recovered. On more than one occasion when the loss of mercury in mills has been under discussion, it has been stated as so much per ton of rock crushed. Now, this seems to be a most misleading method of making the statement. The loss depends on the amount used, and this is dependent on the number of ounces of gold recovered. Where the grade of rock is low, the loss of mercury must be low, since the amount of gold recovered is low, and the reverse is the case when the grade is high.

2. Accurate screen samples cannot be obtained. This is true for two reasons: Some of the gold is amalgamated inside, and beads of mercury and amalgam passing through the screens get into the sample tin.

3. Loss of amalgam. Small beads of amalgam collect on the blanketing of the screens and on their frames, and when screens are changed these fall on the plates. Often, these are not collected in the clean-up pan, but are allowed to remain until the water is turned on, when they are carried away.

Before attempting to set a plate, the operator should see that it is perfectly clean. If the plate is scoured with fine sand, brushed down with a cyanide solution and then washed, it is ready for setting. Sixteen ounces of mercury are sufficient for setting a 16-ft. plate. The mercury, which is sprayed on the plate through canvas, is rubbed into it with a soft brush. If the brush is dipped into a cyanide solution from time to time, it will be found that the mercury will spread much better than if this is not done. Of course, the top of the plate is the proper place at which to begin.

After the plate has been silvered, about 6 oz. of gold amalgam should be rubbed into it.

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*'Notes on Mill Construction, Milling and Amalgamation,' *Journal* of the Chemical, Metallurgical and Mining Society of South Africa, February, 1904.

If this is not done, for the first 24 hours, the plate will not amalgamate more than two-thirds of what it should do. In setting a plate, care must be taken not to get it 'wet' with mercury. When in the best condition for catching both gold and black sands, a plate has a pasty surface.

Plates are dressed every four hours—twice each shift. Ten minutes are allowed for the first dressing, and five minutes for the second, hence the total loss is 45 min. per day. In some mills the stamps are hung up, and when the water has washed the plate clean, dressing is commenced. In others, again, the water is shut off immediately, the stamps are hung up and the plates are left covered with black sand and concentrates. This sand is brushed off and put aside, to be amalgamated in a grinding barrel. The latter is the method which I adopt, and this, I believe, accounts for the varying amounts of gold in the first washing after dressing. I usually get about 0.5 lb. of fine sand washed down into the trough in which I collect the washing, varying with the thoroughness of the brushing.

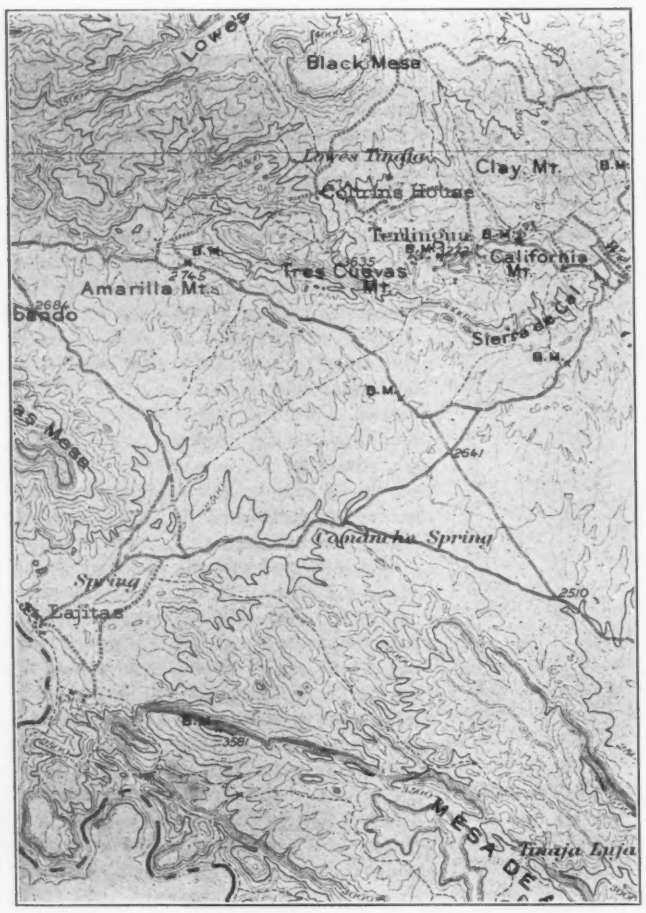
In dressing plates, mercury is sprayed over the upper part—the 3 ft. that is scraped daily—and this mercury oozing downward supplies the lower part. Then an 0.08 per cent cyanide solution is sprinkled over the plate, and the mercury is rubbed in with a hard brush. Afterward, the amalgam is brushed smooth with a soft brush, and, when washed down, is ready for work.

The upper part of the plate is the part that needs most mercury, for it is here most amalgamating is done; 95 per cent of the gold caught by amalgamation is got within 3 ft. of the top of the table. With a low-grade ore it is difficult to keep the lower part of a 16-ft. plate from scouring, and, consequently, I do not see that anything would be gained by putting another plate outside the mill, as has been suggested. Neither mercury nor amalgam should be allowed to leave the mill. After a series of tests running over three weeks, nothing more than a trace of mercury was discovered in the tailings from the Robinson Deep.

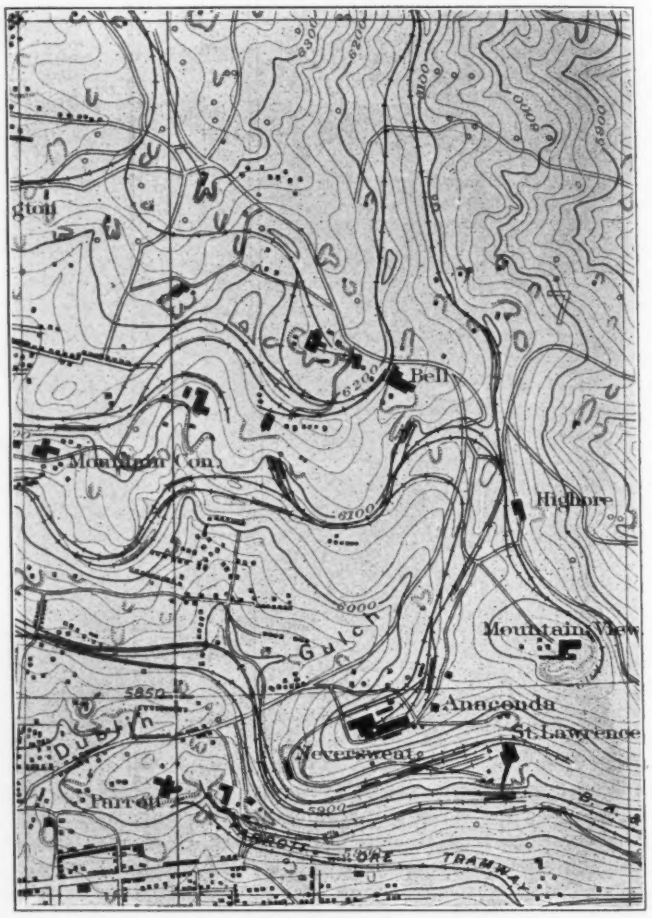
Worn-out plates, before being cast aside, are scaled to get all the gold from them. The process of scaling is as follows: 0.5 lb. sal ammoniac is mixed thoroughly with 0.5 lb. niter and 0.5 lb. spirits of salt, and a pint of water is added. This mixture is applied to the plate with a soft brush, and the plate is allowed to stand for about 15 minutes. Afterward, the plate is heated over a good fire. When it has become quite black—in about half an hour—it is dipped into a bath of water, and the scales washed off. Some mill-men drive off the mercury before applying the above mixture; others do so afterward. Should all the scaling not come off, the parts needing it are treated again. The scales are collected and mixed in equal parts of scales, sulphur, borax and sand. This mixture is melted down in a crucible.

Two samples should be taken in the mill—one before the pulp passes over the plates, and another when it leaves the mill. The first should show the value of the rock crushed, and the latter should indicate the value of the pulp leaving the mill, and the two together should show the extraction on the plates. Undoubtedly, the proper place to take the first sample is at the screen. I find that the sample is best obtained in the following manner:

A sheet-iron lip, about an inch wide, is bolted to the bottom of the screen to carry the pulp clear. Each shift is supplied with an enamelled bucket, with a cover and an enamel sample tin 1 in. wide, 1 in. deep, and 12 in. long, with a handle at one end. This tin is taken the full length of the screen under the lip once every hour, and the contents are placed in the bucket. The contents are assayed separately each day. Every shift-man has his own bucket and tin, so that should a careless sample be taken, the offender can be readily detected. When I mentioned this method of sampling some time ago, it was suggested that, although it was a sample of the screen pulp, it was not a sample of the ore brought to the mill, since an appreciable quantity of free gold would remain in the sands in the mortar-box. This objection I have not found a real one, for when the mortar-boxes are cleaned out after three months' running, the sands are but little richer than those which pass over the plates. The samples taken at the bottom of the plate are obtained in the same way as the screen sample.



SCALE, 1:125,000. CONTOUR INTERVAL, 100 FEET.
TERLINGUA, TEXAS.



SCALE, 1:15,000. CONTOUR INTERVAL, 20 FEET.
BUTTE, MONTANA.

THE GERMAN IRON & STEEL UNION.—This society celebrated its 25th anniversary at a meeting held in Düsseldorf on April 23 and 24. The society has now 2,957 members, and has done excellent work in collecting and publishing the statistics of the trade. To commemorate the occasion a gold medal has been instituted to be called the Carl Lueg medal, which is to be awarded for conspicuous services to German metallurgy. The first medal of the series was unanimously awarded to Herr Carl Lueg, who has been president of the society during the entire term of its existence.

THE VALUE OF TOPOGRAPHIC MAPS.

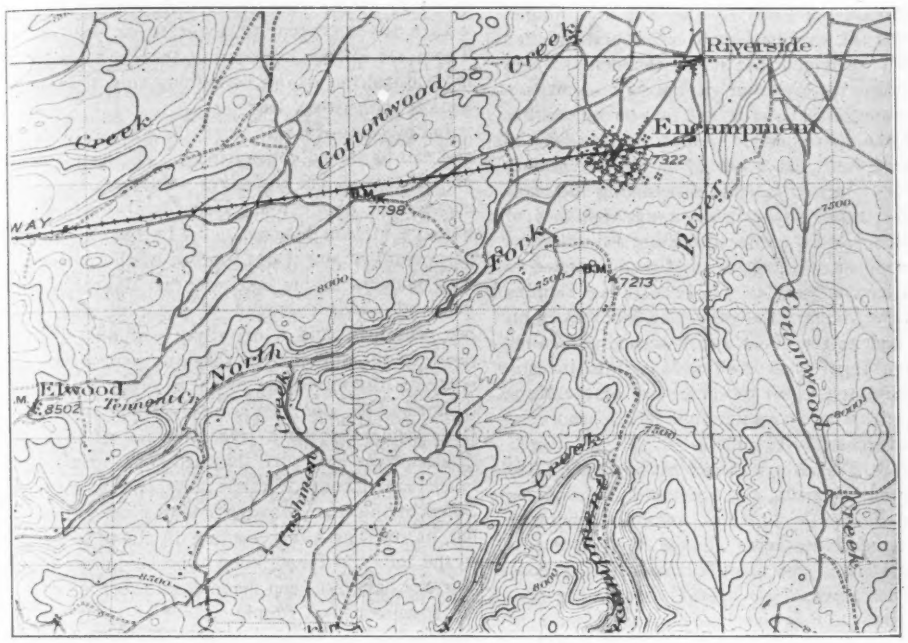
By R. H. CHAPMAN.

The utility of topographic maps to operators in a mining district is one deserving of attention. In cases where a camp has passed its prime, when ore-bodies are becoming more difficult to find, the searchers are apt to clamor for assistance from the geologist, the expert in structures, and the theorist in ore deposition. The basis for the work of such experts, and their first requirement, is a topographic map of such scale as to permit great detail in following outcrops. The value of this work it is not necessary to discuss or to question; it is too well established in the older districts of the West.

On the other hand, a map, even if it be on a very small scale, is also of great assistance to those who travel, explore, or prospect over any given area, and the topographic sheets of the Geological Survey, on scales approximating one and two miles to an inch, have proved of inestimable value, not only for the purposes mentioned, but in the location and development of the resources of a mining district.

The concession of large tracts of land to individuals or corporations for purposes of improvement is practiced by many governments, and seems to be a necessary step in the growth and advancement of a country. The day of such grants in the United States is almost gone, principally because of the opposition of the people to governmental creation of monopolies. The possibilities, however, for land grants remain in Alaska and the Philippine Islands. In Mexico and South America, it is still the practice to make concessions to encourage development of the resources, and it would appear essential that such areas should be mapped before or during the first stages of improvement, in order to permit of intelligent development.

A grant of land of large area, while it may be primarily for *one*, usually covers a number of purposes. So a concession for mining often includes large areas of timber land, grazing land, privileges for the development of water power, the establishment of reservoirs, irrigation schemes, railways, towns and cities. To the owners of such privileges a topographic map on a sufficient scale to show the boundaries, the position of mines, towns, routes of travel, streams, etc., with a contour interval small enough to express the relief in proportion to the scale and boldness, should be of great value. The construction of railways, roads and trails, ditches and pipe-lines can be planned, and much knowledge acquired as to length of line and grade, by using these maps, thus saving a large investment in the preliminary surveys usually necessary long before the feasibility or desirability of a plan can be determined upon. In addition to the usual details, it would be possible to show the nature of the country surveyed, whether timbered or open, rocky, grazing or agricultural land; to show the possible reservoir sites, with approximate fall available for power; the length of line necessary to take the power to a desired site, etc. The above mentioned items are not theoretical, but are substantiated by the uses to which the topographic sheets of the Geological Survey have been put.



SCALE, 1:90,000. CONTOUR INTERVAL, 100 FEET. ENCAMPMENT, WYOMING.

The first important question to be settled in taking up a work is: What will it cost? The expense of making a topographic map depends upon four things:

1. Scale of map and contour interval.
2. Nature and accessibility of the region to be mapped.
3. The area to be mapped, and
4. The length of season available for field work.

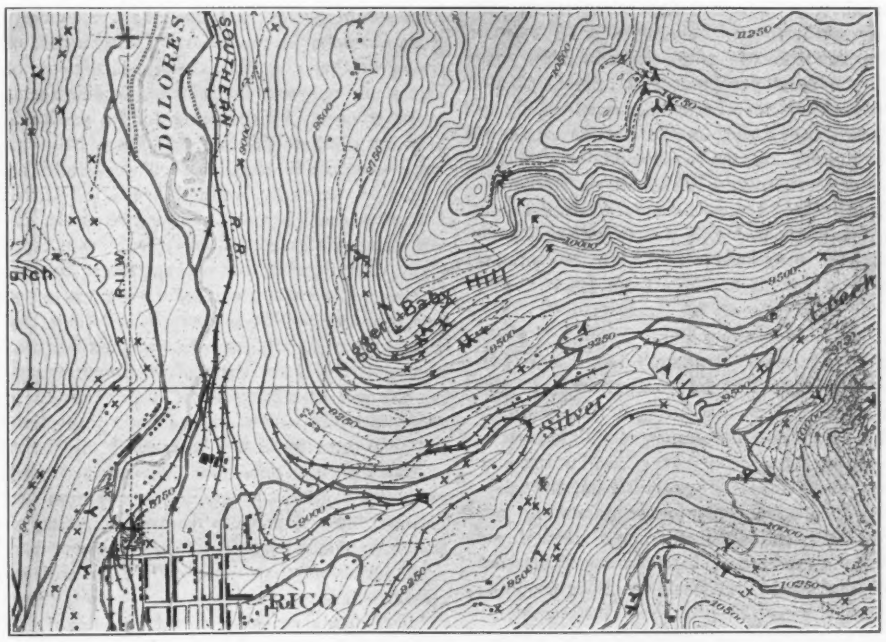
The efficiency of the topographer is a matter for separate consideration.

1. The subject of scale and interval can be discussed best by giving figures of maps made by the Geological Survey. In a region of comparatively easy slopes and grades, a scale of 1:12,000 or 1:15,000 for detailed maps, with contours of 10 and 20 ft. is often used. With a scale of 1:45,000 a contour interval of 20 ft. to 50 ft. or 100 ft. is used, as the region mapped is relatively flat, hilly, or rugged. At 1:90,000 the interval is usually 50 or 100 ft.; the last figure is the one best adapted to show mountain areas in detail.

2. The discussion of the matter of accessibility and resources can be taken up only in actual planning of work, and is most important in the matter of keeping the field party supplied with necessities. As to cost, the figures following, which are based on actual expense to the Geological Survey, will be of interest:

Scale.	Contour interval. Feet.	Area. Sq. miles.	Approximate cost of field-work per sq. mile.
1:15,000	20	24	$80
1:24,000	10	24	25
1:31,000	5	250	12
1:45,000	50	220	12
1:90,000	100	1,000	6 to 15

To make such maps the time required is usually from 3 to 6 months.



SCALE, 1:23,600. CONTOUR INTERVAL, 50 FEET. RICO, COLORADO.

The larger scale work is more often required in regions highly developed, where a party may subsist at local stopping places, and so do away with the necessity of a camping outfit and the resulting attendants.

One very important use for a comprehensive topographic map is its aid to the owners residing at a distance from the field of operations. The plans for, and the progress of, con-

struction can be easily plotted upon such maps, and submitted with letters or reports to the directors or officers not on the ground, thus enabling them to grasp more easily the details and difficulties of the work.

In the accompanying illustrations, which are portions of Geological Survey maps, various scales and contour intervals are shown; on each the roads, trails, streams, towns, railways, township and section lines, civil boundaries and various leveled bench mark elevations are given. On the larger scales, shafts and tunnel mouths are indicated by conventional signs, and on the largest scale, 1:15,000, the size and shape of the bigger buildings is easily recorded.

GRAPHITE IN THE ADIRONDACKS.

The following description of the important graphite deposits in the eastern Adirondacks has been taken from a paper contributed by J. F. Kemp to *Bulletin* No. 225 of the United States Geological Survey.

The Adirondack graphite deposits are found in various associations, as, pegmatite veins; veinlets of graphite; in quartzite, and in crystalline limestones with associated gneissoid strata. All four have been, or are, the objects of serious mining.

Not a few prospects in the pegmatites have attracted attention, but the pockety and uncertain nature of the deposits has made all attempts to work them practical failures except at old and now abandoned workings on Chilson hill, Ticonderoga.

In a few places, as at Split Rock, near Essex, on Lake Champlain, narrow veins or veinlets of graphite cross the gneisses and fill fissures up to an inch in width. A large deposit of this sort would be the richest and most desirable of all, but the veins have nowhere been found in sufficient abundance to justify mining.

The deposits of graphitic quartzites are much the most persistent and reliable of all. Thus far they have been discovered chiefly in the town of Hague, at the northern end of Lake George, on the west side, and in the towns of Dresden and Whitehall, on both sides of South Bay, Lake Champlain. Indications of these quartzites and poorly exposed outcrops have also been observed in the mountains west of Silver Bay, Lake George, and on the east side of the lake as well. The rocks also occur along Lake Champlain south of the village of Putnam. There are two mills at Hague for the concentration of the quartzites.

The crystalline limestones, so abundant in the Adirondacks, have never been utilized as a commercial source of graphite, but they present certain advantages to the miner and are worthy of serious consideration. The limestone is a soft rock, easily crushed, and in separation would free itself from the graphite.

GOLD PRODUCTION OF PERU.—The production of gold in Peru in 1903 is estimated by T. Olachea (*Boletin de Minas*, March 1, 1904) at 1,963 kg. or $1,304,610. This is an unfavorable showing, as compared with the previous year's output, which was $1,750,000. The decline was due largely to a suspension of operations at the Santo Domingo mine and to the smaller return from the ores of Quinua.

ZINC ORES IN BRITISH COLUMBIA.

By E. Jacobs.

The zinc question has recently excited much attention in British Columbia, and at a recent meeting the Associated Silver-Lead Mines passed a resolution "to endorse the proposal of the low-grade miners, whereby the Dominion Government is to be requested to extend the benefits of the Lead Bounty Act to a limited amount of ore to be exported and smelted abroad; provided that such extension shall not prejudice the payment of the full bounty on ores smelted in Canada." The bearing this has upon the zinc question is that the lead ores of most of the mines benefited by the lead bounty also contain zinc, so that in assisting the lead-mining industry the opening up of bodies of zinc ores is aided. A second resolution passed by the Associated Silver-Lead Mines instructed its special committee "to memorialize the Dominion Government to engage a high authority on zinc and its treatment (such an one as Walter Renton Ingalls, of Boston, Mass.) to investigate and report on the zinc ores of the Kootenays." These resolutions have been endorsed generally by others.

Mr. A. C. Garde, manager of the Payne Consolidated Company, and chairman of the Associated Silver-Lead Mines, recently submitted a statement with regard to the occurrence and importance of zinc in the Province, which contains much valuable material. Mr. Garde says that zinc ore deposits have been known for 10 years, but have only recently received attention. It has been found that in many mines lead in depth gave place to zinc, or else the two metals were so intermixed that some process had to be adopted to separate the two ores. This led to the opening up of the market for zinc ore, which had been previously wasted in concentrating. Many difficulties confronted the mines; some had ores very complex in their nature, others had low values in silver, or there were obstacles in concentrating and in cost of transportation, so that the establishment of zinc smelting works in British Columbia seems to be a necessary condition to the profitable working of these mines. Capitalists, however, were reluctant to establish such works until an economic necessity was shown. In British Columbia there is a wide difference in the silver value of these ores. In the Slocan, especially near Sandon, the average silver content in the zinc ores is about 25 oz. per ton of 50 per cent ore. This is much lower than had been supposed, and removes the possibility of mining the ores for their silver value, regarding the zinc as a by-product. Of course, there are some ores which carry a high proportion, but they seem to be the exception.

At the present time some zinc ores are being exported to the United States and some to Europe, but the profit is very small owing to the heavy cost of freight. There is every prospect, however, that these conditions will be changed before long.

Mr. Garde's report gives an account of the different deposits of zinc-bearing ores in the Province, a summary of which is presented below:

Payne (Sandon).—This mine's first zinc shipment of 1,000 tons was made to the Lanyon Zinc Company, of Iola, Kan., in 1902. The ore averaged about 41 per cent zinc and contained 9 oz. silver to the ton. In 1903 the Payne Company put in a magnetic separating plant, which eliminates all but about 5 per cent of the iron and reduces the quantity of other impurities, thus making zinc concentrates of a character desirable for spelter manufacture. Concentrates are now being shipped to Antwerp, Belgium, under contract, at the rate of between 200 and 300 tons per month. The total quantity of zinc shipped by this mine to March 31 is about 1,800 tons. The estimated output is now at the rate of about 3,000 tons per annum of 52 to 55 per cent zinc-blende concentrates with a silver content of about 10 oz. per ton. There are known to occur in the Payne mine large quantities of ore containing zinc in association with silver-lead.

Lucky Jim.—In this mine the vein is wide and can be mined conveniently. The blende is of high grade, but the silver values are low—about 6 oz. to the ton. There is also a large tonnage of lead blocked out. In 1899 an experimental shipment of 1,800 tons of zinc-blende was made to a zinc smelter near Manchester, England. This averaged 50 per cent zinc, 3 per cent lead, and 6 oz. silver per ton. The death of the promoter of this enterprise necessitated a discontinuance of operations.

Slocan Star and Silversmith.—These properties, besides having a large tonnage of high-grade silver-lead ore blocked out, contain much zinc-blende suitable for concentrating. Some of this zinc ore carries high silver values, but its average silver content is about 50 oz. to the ton. So far as known, no shipments of zinc ore have yet been made from these mines, but some 200 tons running about 40 to 45 per cent blende and 150 oz. silver have been held over awaiting higher prices. The Slocan Star company is reconstructing its milling plant so as to be able to produce zinc concentrates as well as high-grade silver-lead concentrates.

Ivanhoe.—This mine shipped about 500 tons of zinc-blende concentrates to United States smelters during the first quarter of 1904. The average assay of its product is given as 44 per cent zinc, 28 to 30 oz. silver, 4 per cent lead and 6 per cent iron. Present output of zinc ore is about 200 tons monthly.

Washington.—This mine has some 30,000 tons concentrating ore exposed, part of it being zinc-blende sorted out from its high-grade silver-lead ore, when that was being prepared for shipment, and part in place in the mine. The ore is similar to that of the Payne, near which it is situated.

Whitewater.—This mine is believed to have a fair tonnage of zinc-blende exposed, but heretofore the zinc eliminated from the silver-lead ore in the course of concentrating was run to waste. No zinc ore has been shipped as such.

Whitewater Deep.—The conditions here are similar to those at the adjoining Whitewater mine. A considerable tonnage of good concentrating material is available.

Ruth.—Quite a large tonnage of zinc-blende is available here and about 700 tons are on hand awaiting disposal. The Ruth mine has its own concentrator and during the past year a zinc by-product assaying 40 per cent zinc, 10 oz. silver, 2 per cent lead, 16 per cent iron and 5 per cent silica has been made.

Reco and Goodenough.—These adjoining properties are worked together. Their silver-lead ores are of high grade. The zinc ore of the Reco is of a desirable character and it carries high silver values. The tonnage exposed is not large. The Goodenough has about 800 tons of concentrating ore in the dump which will average 50 per cent zinc and nearly 100 oz. silver per ton.

Rambler-Cariboo (McGuigan Basin).—Zinc

is associated with high-grade silver ores in this mine. Much of it has been saved when concentrating the silver ores, the intention having been to make a suitable zinc product of it later. It is estimated that there are 30,000 tons on hand, running about 13 per cent zinc and containing a considerable percentage of argentiferous galena. This season's mill run will probably add some 20,000 tons more.

Antoine (McGuigan Basin).—No shipments of zinc have yet been made from this mine, but it is reported to have a quantity of zinc ore running high in silver. One lot of between 20 and 30 tons, recently sorted out, gave an average assay of 40 per cent zinc, 75 oz. silver and 2 per cent lead.

Jackson (Jackson Basin).—This mine has extensive deposits of zinc and galena. The zinc ore is in many respects similar to that of the Ruth mine, mentioned above. The Jackson concentrator is being remodeled in order to save the zinc.

Monitor (Three Forks).—At this mine there are on the dumps approximately 3,000 tons of zinc-blende mixed with galena and iron, which was sorted out when the silver-lead ore was being shipped. The English company owning the property will probably this year erect a concentrating plant with a magnetic separator.

Idaho-Alamo (Three Forks).—In former years this property produced a large quantity of high-grade silver-lead concentrates. Its old concentrator has been remodeled with the object of producing a zinc by-product. The zinc and lead ores here require careful treatment to avoid losses by sliming.

Mountain Chief (Slocan Lake).—This is an old silver-lead producer, and croppings of very desirable zinc ore are found on the surface of the property.

Bosun (Slocan Lake).—The Bosun vein was narrow near the surface and carried galena. As depth was made the vein widened and zinc came in, and latterly the proportion of zinc was three times that of lead. Zinc shipments to date total 1,440 tons; 620 tons each to Antwerp, Belgium, and Iola, Kan., and 200 tons to the Canadian Smelting Works, Trail, B. C. The average metal contents of this ore were 41.8 per cent zinc, 71.3 oz. silver, 1.08 per cent lead and 6.4 per cent iron. The ore averaged as well, 13 per cent silica, 3 per cent lime and 20 per cent sulphur. The management worked under several disadvantages, among them being that the best terms it was able to make with the zinc smelters included payment for only 75 per cent of the silver contents of its product, while shipments to Antwerp involved payment of a $21 freight rate as compared with the $13 rate now charged.

Emily Edith.—This mine is near the Bosun and its ore is of a similar character. No zinc has yet been shipped.

Wakefield (Silverton).—This mine is reported to have a large body of ore. The concentrator on the property was designed for treating high-grade silver ores. During a four months' run in 1903 it produced, as a by-product, 235 tons of zinc concentrates, which averaged 45 per cent zinc, 44 oz. silver, 5 per cent lead and 3 per cent iron. The mill feed assayed, on an average, 14 per cent zinc. The zinc was shipped to the Lanyon Zinc Company. As the concentrator has been modified to suit the changed conditions this mine's zinc shipments will probably be much larger this year.

Hewitt.—This mine is near the Wakefield. Mill tests show that the ore, of which there is a large body blocked out, is suitable for the production of a desirable grade of zinc concentrates. Not much ore has yet been shipped, but that sent out for its silver contents contained about 12 per cent zinc.

Galena Farm and Noonday.—These properties are also in the neighborhood of Silverton. They have been idle for several years, and when they were worked it was for their silver-lead ores.

Enterprise (Ten-Mile Creek).—During 1903, about 1,000 tons of silver-lead-zinc ore were mined here and shipped to local smelters. The average assay value of the ore was 23.9 per cent zinc, 157.9 oz. silver and 17.5 per cent lead. The mine is now being worked under lease and the ore is hand-sorted to reduce the zinc as low as possible on account of the penalty for the excess over 10 per cent. Aside from the assorted zinc product on the dumps there is not a large tonnage of zinc ore in sight.

Blue Bell and Silver Hill (Kootenay Lake).—There is known to be a large tonnage of low-grade zinc ore on these properties, but as they have not been worked for years no particulars are available.

South Fork of Kaslo Creek.—The Province, Cork, Florida and Montezuma, among others, give promise of producing a considerable tonnage of zinc-blende.

Ainsworth.—A good showing of zinc is found in this camp. Among others the Highlander, Krao, Galligher, Glengarry, Ayesha, No. 1 and Dillie possess zinc ores that run low in silver and somewhat higher in iron than the ores of the Sandon district. These would not stand transportation, but would supply a desirable product for local zinc reduction works.

St. Eugene (East Kootenay).—More or less zinc is stated to occur in this mine, but very closely mixed with the lead and iron, so that a marketable product under existing conditions has not been found profitable.

Other Properties.—There are extensive surface showings of zinc on the west side of Upper Arrow lake, opposite Halcyon Hot Springs. Along the Canadian Pacific main line zinc has been found at a number of places in the Illecillewaet, Revelstoke and Golden mining divisions; but at all these places the ores are, as a rule, heavily mixed with iron, or lead, or both, with their silver values low. Some of them must be classed with complex ores. The Monarch mine, on Mount Stephen, near Field, some years ago produced some 2,000 tons of lead ore with which was mixed zinc-blende. North of Vancouver City, on Lynn creek, some interesting prospects have been located, and surface samples of zinc-blende from these have assayed up to 50 per cent zinc. On Vancouver Island and further up the coast, as far north as Queen Charlotte Islands, finds of zinc-blende have been reported, but no particulars of these have been obtained. Few, if any, of these scattered properties, other than the Monarch, have shipped zinc. They are, for the most part, simply prospects, and under present conditions their ores would not stand the high freight rates to either Europe or the United States, so their development will probably be conditional upon zinc reduction works being established at some convenient point in British Columbia.

RUSSIAN IRON ORE IN GERMANY.—The imports of Russian iron ore into Germany in 1903 reached a total of 220,197 tons, which is more than four times the quantity imported in the preceding year.

DOUBLE CYANIDES OF ZINC WITH POTASSIUM AND WITH SODIUM.*

By W. J. SHARWOOD.

The composition of the zinc cyanide prepared was found to vary between $ZnCy_2$ and $ZnOZnCy_2$; when thrown down from dilute solutions or copiously washed it approached the latter formula, but by special precautions an almost normal salt was obtained.

Potassium zinc cyanide (K_2ZnCy_4) was readily prepared of a high degree of purity. It was found that 11.0 parts of this salt dissolved in 100 parts of water at 20° C., while organic liquids had no appreciable solvent action. Sodium zinc cyanide is extremely soluble, and could not be prepared pure; the salt obtained approached the composition $NaZnCy_3$, but in dilute solutions Na_2ZnCy_4 occurs.

Potassium cyanide, in dilute solution, dissolves zinc cyanide in accordance with the equation

$$2KCy + ZnCy_2 = K_2ZnCy_4$$

Potassium cyanide, in decinormal solution, dissolves zinc oxide in agreement with the equation

$$20KCy + 6ZnO + 4H_2O = 5K_2ZnCy_4 + K_2ZnO_2.8KOH,$$

which may be explained as taking place in two steps,

$$4KCy + ZnO + H_2O = K_2ZnCy_4 + 2KOH,$$

the potassium hydroxide further reacting,

$$10KOH + ZnO = K_2ZnO_2.8KOH + H_2O.$$

On boiling the mixed solution the zincate is partially decomposed with precipitation of zinc oxide.

Dilute solutions of potassium hydroxide dissolve zinc cyanide. If the zinc cyanide is in a less proportion than corresponds to $ZnCy_2 + 2KOH$, it is dissolved completely and permanently:

$$4KOH + 2ZnCy_2 = K_2ZnCy_4 + K_2ZnO_2 + 2H_2O,$$

although upon heating most of the zincate is decomposed with precipitation of zinc oxide, leaving free alkali in solution. Zinc cyanide is also completely dissolved in proportions up to that of $ZnCy_2 + KOH$, but zinc oxide begins shortly to fall out. Any further excess of zinc cyanide is unaffected.

When the zinc cyanide corresponds to, or is in excess of, the proportion of one molecule to one of hydroxide, it is dissolved in that proportion, but one-half of the dissolved zinc separates out as oxide,

$$2KOH + 2ZnCy_2 = K_2ZnCy_4 + ZnO^{solid} + H_2O.$$

This peculiar effect is probably due to the temporary formation of compounds analogous to $NaZnCy_3$ and $Na_2Zn_2O_3$, which have been recognized but are not stable in dilute solutions.

The increase in solvent power of potassium zinc cyanide solutions, toward gold, on addition of caustic alkali, confirms the reaction:

$$K_2ZnCy_4 + 4KOH = K_2ZnO_2^{solution} + 4KCy + 2H_2O$$

as taking place in dilute solution, and only to a very limited extent.

The equation $K_2ZnCy_4 + 2KOH = Zn(OH)_2^{solid} + 4KCy$ is contrary to all observed facts.

In *dilute* solutions the action of the equivalent sodium compounds is almost identical with that of potassium cyanide and hydroxide as noted above.

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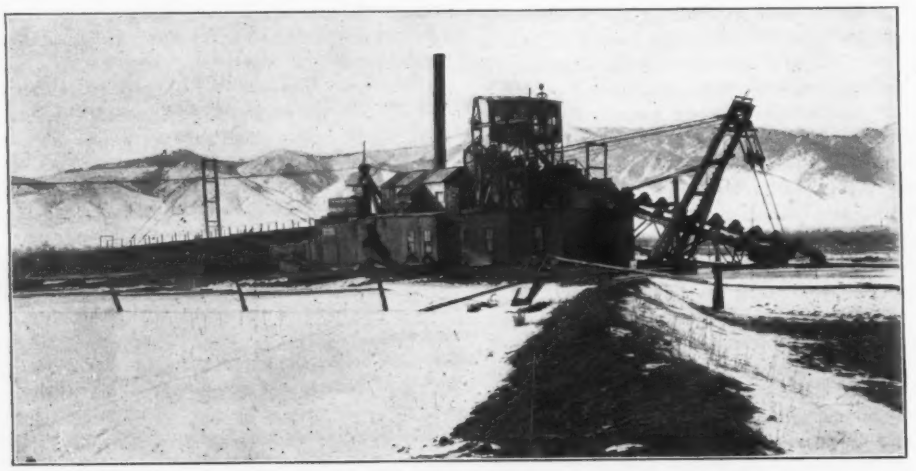
*Abstract of thesis entitled 'A Study of the Double Cyanides of Zinc with Potassium and with Sodium.' University of California, April 27, 1904.

GOLD DREDGING IN MONTANA.

BY OUR SPECIAL CORRESPONDENT.

The accompanying illustration shows the larger dredge operated by the Conwey Placer Mining Company, in the Ruby valley, twelve miles below old Virginia City, in Madison county, Montana. The only thing remarkable about the picture, is that it was taken in the midst of a Montana winter, with the boat in operation. The company has kept two of its dredges in service continuously during the cold weather. The one shown is the newer and larger dredge, and is using a bucket of 10 cu. ft. capacity. The winter has been an unusually mild one, the thermometer reaching, respectively, 6° to 17° below zero for short periods only, and most of the time ranging from freezing to zero.

The frost, on an average, did not reach deeper than 24 in. The management found by experience that the frozen sod could be handled by the buckets to a thickness of 12 to 15 in.; when thicker than that, it had to be broken



DREDGING IN WINTER IN MONTANA.

in advance of the boats by blasting. This was accomplished most effectively by using small charges of giant powder, placed close together, about half a stick to a hole on an average for every 10 sq. ft. of surface to be broken.

The gold is saved by riffles, carried in a sluice-box 125 ft. long, built of 0.25-in. sheet iron. This thin iron construction is more readily affected by changes of temperature than wooden boxes, but while it allows freezing more easily, the riffles can be more readily thawed out by turning steam through a hose against the metal bottom. The constant flow of water prevents the freezing of the riffles on the surface. The trouble first encountered from freezing from below was overcome by surrounding the bottom and part of the sides of the sluice with a light wooden casing, set 12 in. below the bottom of the sluice-box and keeping the enclosed air space warmed by means of a steam-pipe. The sluice-box is carried by an independent flat-boat, or scow, which floats in the rear of the dredge, the box being supported, or suspended, between two masts. The head-end of the sluice is attached to the dredge by a pivot-like connection; therefore, any swing the dredge may take will not disturb the position of the sluice-box.

The company has operated in the neighborhood for five years, and has three boats; it proposes building one or more new dredges this season. It owns several thousand acres of dredging ground. Mr. Julius Baier is manager.

ELECTROLYTIC IRON.

Recent experiments have shown the practicability of producing iron by electrolysis at a cost which would permit its employment for industrial purposes, if uses can be found for such a pure grade of metal. The experiments were carried out by C. F. Burgess and Carl Hambuechen, of the University of Wisconsin, who communicated the results to the recent meeting of the American Electrochemical Society at Washington. The process employed consists, briefly, in electrolyzing a solution of ferrous sulphate containing a certain percentage of ammonium sulphate, using anodes of ordinary iron and cathodes of thin sheet-iron carefully cleaned of rust. The tanks measure 13 in. long, 8 in. wide and 15 in. deep and are fitted with two anodes and one cathode. A current density of from 6 to 10 amperes per square foot of cathode surface is employed, with an e. m. f of about one volt. The current efficiency of deposition is said to be close to 100 per cent, giving, under the conditions stated, about 2.2 lb. of iron per kilowatt-hour. A run of two months' duration showed that the process can be conducted with little trouble, and that the expense does not greatly exceed the cost of refining copper which is under 0.5c. per pound. The grade of iron produced is of great purity, averaging above 99.9 per cent. Carbon, silicon, manganese and the usual impurities appear to be absent, but on the other hand it contains more or less hydrogen. The presence of this element tends to increase the hardness of the iron, but it can be removed by heating, when the metal becomes softer and assumes properties of malleability and toughness similar to those of Swedish iron. It is suggested that electrolytic iron may serve as an excellent basis for purposes of investigation, particularly in the study of iron alloys; and it may also be of use for manufacturing chemically pure iron compounds, and for standardizing solutions in the chemical laboratory.

POWER FROM BLAST FURNACE GAS.—The London *Electrical Review* says that, until recently, the iron works at Ilseder, Germany, have employed part of the gas from the blast furnaces, which produce 220 tons of iron per day, for raising steam which was applied in an electric generating plant of 1,830 h. p. Recently, Oechelhauser gas engines of 1,000 to 1,200 h. p. each have been installed, and the plant is designed for a total of 6,000 h. p. with facilities for extension to 12,000 h. p. The gas-driven blowing engines of 500 h. p., installed for trial purposes before transforming the whole plant, were found to use only one-fifth as much gas as was required for raising steam for the steam-driven blowing engines.

ELECTRIC SMELTING OF IRON ORE.

BY OUR SPECIAL CORRESPONDENT.

Dr. Haanel, Dominion superintendent of mines, who recently made an investigation into electric smelting in Europe for the Canadian Government, has made a preliminary report as to the electric smelting of ores, detailing the results of his work. The report states that in the experiments made at Livet, France, 90 tons of ore were used to demonstrate the economic production of pig iron by the electric process; the furnaces used being those employed by Keller, Leleux & Co. in their regular work of making the various alloys, such as ferro-silicon, ferro-chrome, etc., and of the resistance type. The approximate cost per ton was $10.60, comprising the following items:

1.	Ore (hematite metallic iron 55 per cent, 1,842 tons at $1.50 per ton	$2.76
2.	Coke for reduction, 0.33 tons at $7 per ton,	2.31
3.	Consumption of electrodes at $5 per 220 pounds	0.77
4.	Lime	0.30
5.	Electric energy, 0.226 horse-power year at $10 per e. h. y	2.26
6.	Labor at $1.50 per day	0.90
7.	Different materials	0.20
8.	General expenses	0.40
9.	Repairs, maintenance, etc	0.20
10.	Amortization (machinery and buildings)	0.50
	Total, exclusive of royalty	$10.60

The report proceeds to point out that the results obtained were derived from experiments in furnaces not specially adapted to the work required. The improved furnace, of which the commission has secured detailed drawings, permits, on account of higher column of charge a more effective use of the reducing power of the carbon monoxide evolved, and the employment of machinery for charging the furnace would reduce the cost of labor. It is, moreover, reasonable to expect that, as experience accumulates, the design of the furnace best suited to the conditions of high temperature to be dealt with will undergo changes, which will reduce the absorption of electric energy to a minimum. The electric engineer will be called on to design electric plants specially suited to smelting. When it is considered that the process is applicable to the smelting of all other ores, and that the furnaces are of simple construction, and the regulation of heat supply under perfect control, we may expect that the application of electric energy to the extraction of metals from their ores will not be long delayed. Experience will result in displacing some costly and complicated methods by comparatively simple and economic processes.

AMMONIUM SULPHATE IN GERMANY.—Nearly 47 per cent, or 65,000 tons of the 140,000 tons produced last year, was contributed by the syndicate at Bochum, which has added to its list the General Blumenthal works at Recklinghauser, the Dorstfeld works, and the Henrichenburg colliery at König Ludwig. By a systematic propaganda the syndicate has greatly increased the consumption of ammonium sulphate, and in addition to the enlarged production, there were imported, in 1903, into Germany, 35,168 tons, principally from Great Britain.

BRITISH IRON TRADE.

In the JOURNAL for April 24, page 638, we gave the pig-iron and steel production of Great Britain. The British Iron Trade Association has now made public the figures collected for the production of wrought or puddled iron. They are as follows, in long tons:

District.	1902.	1903.	Changes.
Scotland	225,900	196,078	D. 29,822
Cleveland	135,400	119,087	D. 16,313
Lancashire	135,090	132,588	D. 2,502
South Staffordshire	238,046	210,219	D. 27,827
North Staffordshire	105,777	95,600	D. 10,177
Yorkshire	76,953	124,341	I. 47,388
Derbyshire	38,412	34,113	D. 4,299
Shropshire, etc.	32,700	38,367	I. 5,667
Totals	988,278	950,393	D. 37,885

The chief items of production in 1903 were, in the order given, bars, wire rods, sheets and hoops. At the close of the year 1,147 puddling furnaces were in operation and 308 were not in use.

Imports of iron ore, in detail, were as follows, in long tons:

	1902.	1903.	Changes.
Spain	5,309,733	4,945,086	D. 364,647
Greece	335,824	316,648	D. 19,176
Sweden	167,083	244,999	I. 77,916
Algeria	215,632	222,619	I. 6,987
France	66,172	130,078	I. 63,906
Norway	624	123,611	I. 122,987
Italy	182,053	111,197	D. 70,856
Newfoundland	91,317	49,536	D. 41,731
Other countries	86,319	107,204	I. 20,935
Total	6,454,757	6,251,078	D. 203,679

Among the other countries were Germany, Turkey and Portugal. No ore was imported from the United States in 1903 and only 42 tons in the preceding year.

CHANGES IN MEXICAN TARIFF.

A United States consular report sums up the changes in the Mexican tariff, which took effect on April 1. We give below the sections affecting metals, mineral products and machinery. The rates of duty are given in Mexican currency, that is, in silver. The Mexican customs assess the duties on net, legal and gross weight. By net weight is meant the actual weight of the goods without the interior or exterior packing; by legal weight is meant the weight of goods together with that of their interior packing, such as wrappers, receptacles, cardboard and wooden boxes, tins, etc., inclosed in the outer packing case in which imported; by gross weight is meant the weight of the goods with all their packages, both interior and exterior, without deducting the cross framing, straw or shavings, hoops, etc., used for packing.

The sections referred to are as follows:

Sec. 69. Leather belts for machinery, whether imported with the machinery or apart: When imported with the machinery to which they appertain such belts are at present subject to a duty of 1c. per gross kilogram. The new duty is 50c. per gross kilogram, whether the belt is or is not imported with the machinery in connection with which it is to be used.

Sec. 70. Belts of cow hair for machinery, whether or not imported with said machinery: The present rate is 10c. per gross kilogram when imported apart and 1c. per gross kilogram when imported with the machinery to which it belongs. The new rate is 10c. per gross kilogram, whether imported with machinery or not.

Sec. 266. Copper in pigs or grains: Present rate per gross kilogram, 10c.; new rate, free.

Sec. 266 (*a*). Bronze, brass and white metal, in pigs or grains: Present rate per gross kilogram, 10c.; new rate per gross kilogram, 4c.

Sec. 269. Copper ore, un-treated, and copper matte: At present copper ore and copper matte are free if not containing more than 50 per cent of pure copper. If the proportion of copper is greater, the duties of 10c. per gross kilogram are assessed thereon under present section 266. Under the new arrangement copper ore and copper matte will enter duty free, whatever the copper content may be.

Sec. 270. Wire of copper, brass, bronze, or white metal covered with any material: New rate per gross kilogram, 5 cents.

Sec. 271. Bare wire of copper, brass, bronze, or white metal, not exceeding 2 mm. in diameter: New rate per gross kilogram, 8 cents.

Sec. 272. Bare wire of copper, brass, bronze, or white metal, exceeding 2 mm. in diameter, per gross kilogram, 5 cents.

Sec. 272 (*a*). Cables of copper, brass, bronze, or white metal covered with any material, but without a metallic sheath inside or outside the covering substance and uncovered cables of the same metals of all diameters: Present rate, 50c. per legal kilogram and free; new rate per gross kilogram, 5 cents.

Sec. 272 (*b*). Insulated cables with metallic sheath inside or outside the insulating material: Old and new rate, free.

Sec. 305. Steel in bars, round, square, prism shaped, semicircular, octagonal, hexagonal, or T shaped: Present and new rate per gross kilogram, 5 cents.

Sec. 307. Iron or steel wire exceeding 1 mm. in diameter: Present rate per gross kilogram, 4c.; new rate per gross kilogram, 5 cents.

Sec. 308. Iron or steel wire, 1 mm. in diameter or less: Present rate per gross kilogram, 6c.; new rate per gross kilogram, 8 cents.

Sec. 311. Iron wire for fences: Present rate per gross kilogram, 1c.; new rate per gross kilogram, 2 cents.

Sec. 312. Stamps, dies and shoes of iron and steel: Present rate per gross kilogram, 1c.; new rate per 100 gross kilograms, $1.50.

Sec. 313. Plows and loose pieces or repair pieces thereof: Present rate per gross kilogram, 1c.; new rate per 100 gross kilograms, $1.50.

Sec. 315. Empty iron barrels: Present rate per net kilogram, 1c.; new rate per gross kilogram, 3 cents.

Sec. 317. Iron piping of all dimensions, even though tinned: Present rate per net kilogram, 1c.; new rate per 100 net kilograms, $1.50.

Sec. 320. Iron crucibles: Present rate per gross kilogram, 1c.; new rate per 100 gross kilograms, $1.50.

Sec. 321. Axles and hubs of iron or steel for carts and carriages: Present rate per gross kilogram, 10c.; new rate per gross kilogram, 6 cents.

Sec. 322. Iron in pigs, resulting from the first furnace treatment, or in filings, or in scraps: Present rate per gross kilogram, 1c.; new rate per 100 gross kilograms, $1.50 .

Sec. 322 (*a*). Wrought iron in rough pigs and steel in pigs: Present rate per 100 gross kilograms, $1.50; new rate per gross kilogram, 2 cents.

Sec. 323. Iron in bars, round, square, prism-shaped, and semicircular: Present rate and new rate per gross kilogram, 5 cents.

Sec. 323 (*a*). Iron bands for binding bales: Present rate per gross kilogram, 5c.; new rate per gross kilogram, 7 cents.

Sec. 324. Bent iron bars of angular section and T-shaped bars: Present rate per 100 gross kilograms, $2.50; new rate per 100 gross kilograms, $5.

Sec. 326. Iron or steel in plain sheets, unspecified, as well as corrugated sheets and sheets for roofing, even though painted or galvanized, and perforated sheets for riddling or screening: The present rate for all the above, with the exception of perforated sheets for screening or riddling, is 4c. per gross kilogram. The present rate for perforated sheets for riddling or screening is 1c. per gross kilogram. The new rate for all of the above is 6c. per gross kilogram.

Sec. 328 (*a*). Machetes of all kinds: New rate per gross kilogram, 5 cents.

Sec. 331. Posts, cross arms and pins of iron or steel for overhead electric wires: Present rate, free; new rate per 100 gross kilograms, $1.50.

Sec. 332. Iron or steel rails, when the lineal meter weighs more than 12 kilograms: Present rate, free; new rate per gross kilogram, 1 cent.

Sec. 332 (*a*). Iron or steel rails, when the lineal meter does not exceed 12 kilograms, and switches, ties, frogs, spikes, fish plates, and other accessories for rails: Present and new rate, free.

Sec. 333. Iron or steel girders for buildings, when they have no perforations nor special cut: Present rate per gross kilogram, 1c.; new rate per gross kilogram, 2 cents.

Sec. 333 (*a*). Girders and columns of iron or steel, when they have perforations or are of a special cut, frames, bracket arms, bed-plates for columns, fish plates, braces with or without nuts, and other parts not specified, of iron or steel, for structural purposes: Present rate for all braces, per gross kilogram, 1c.; present rate for iron or steel braces, per legal kilogram, 10c.; uniform new rate per gross kilogram, 3 cents.

Sec. 336. Unspecified manufactured articles of tin plate and of iron, tin plated, nickel plated, copper plated, or brass plated, wholly or in part, whatever may be their weight: Present rate per legal kilogram, 20c.; new rate per legal kilogram, 20c. New wording.

Sec. 340. Nails, tacks, screws, bolts, nuts and rivets of iron and steel: Present rate per legal kilogram, 10c.; new rate per legal kilogram, 10c. There has been here a mere change of wording. Present section 340 includes iron and steel braces, but inasmuch as said braces are to be included in section 333 (*a*) it was necessary to re-word No. 340.

Sec. 341. Tanks, cisterns, receptacles or tubs of iron or steel having a capacity of more than 2,500 liters: Present rate per gross kilogram, 1c.; new rate per 100 gross kilograms, $1.50.

Sec. 379. Refined mineral oil: Present rate per legal kilogram, 10c.; new rate per legal kilogram, 8 cents.

Benzine: Present rate per legal kilogram, 10c.; new rate per legal kilogram, 8 cents.

Mineral wax: Present rate per gross kilogram, 10c.; new rate per legal kilogram, 8 cents.

Paraffine: Present rate per gross kilogram, 10c.; new rate per legal kilogram, 8 cents.

Sec. 704. Calcium carbide: Present rate per gross kilogram, 6c.; new rate per gross kilogram, 4 cents.

Sec. 800. Machines of all kinds for industries, agriculture, mining, and the arts, not specially designated, and their loose parts or repair pieces: Present rate per gross kilogram, 1c.; new rate per 100 gross kilograms, $1.50.

'Snowflake marble,' used in the preparation of carbonic acid for making artificial mineral waters, is finely ground dolomite.

RECENT LITERATURE ON ECONOMIC GEOLOGY.—XV. COAL.

By H. FOSTER BAIN.

Coal Report. By I. C. White, State Geologist. West Virginia Geological Survey, Vol. II., pp. 725.

This important report fills a long troublesome gap in the literature of American coal fields. The development of the West Virginia field has been so rapid that discussion of its stratigraphy has not kept pace with the opening of the mines. This increase in production is shown in the following figures: 1873, 672,000 tons; 1883, 2,335,833 tons; 1893, 10,708,578 tons; 1903, 25,760,000 tons. The State now ranks third in production, and in the opinion of this author will eventually assume first place. Such a detailed discussion as is here presented is, therefore, much needed. The report was prepared with no expense to the State except for printing and chemical work. It includes a revised edition of the table of altitudes, given in the earlier volume issued by the Survey, and is accompanied by a useful map of the State on a scale of eight inches to the mile. On this map are shown the oil and gas wells, the coal mines, and the areas underlain by the Pittsburg, the Allegheny-Kanawha, and the New River-Pocahontas coals. The main features of the topography are indicated in the eastern portion of the State.

The body of the report comprises a careful discussion of the stratigraphy of the coal measures. The well-known Pennsylvania divisions are recognized, except that the beds between the Kanawha black flint and the top of the undoubted Pottsville are temporarily termed the "Kanawha series," with the understanding that the deposits in question include not only the Allegheny series, but also any beds between the latter and the Pottsville, which may make their appearance between the Pennsylvania border and the Great Kanawha river. In this series six of the coal beds of the region are placed and correlated as follows: Stockton (Cannelton)-Upper Freeport; Colburg-Lower Freeport; Winifrede-Upper Kittanning; Cedar Grove-Middle Kittanning; Camp Creek-Lower Kittanning; Eagle-Clarion.

The coal measures, as a whole, have an estimated original thickness varying from 2,305 ft. at Moundsville to 4,905 ft. at Welch. In character they do not greatly differ from the beds in Pennsylvania, except in the greater thickness of the lower measures and the presence of the thick, pure coals of the Pottsville in the Flat Top region. Each coal bed is carefully described, and numerous analyses are given. The description of the Pittsburg bed is quite complete and satisfactory. In connection with it the article by Mr. Frank Haas of the Fairmont Coal Company (pp. 210-221) will be read with interest. He gives the following as the average of 51 analyses of carefully collected samples: Moisture, 143; volatile matter, 37.47; fixed carbon, 53.83; ash, 7.27; sulphur, 2.59; calorific power, 14,014 B. T. U. The heating value as determined by the Mahler calorimeter was compared with results calculated by means of the formula: B. T. U. = H (100 — Ash — S — Moist) + (S × 4050), (*Transactions* American Institute Mining Engineers, XXVII, 250). The maximum discordance was less than 1 per cent, and in most instances amounted from 0.2 to 0.3 per cent. Mr. Haas also made interesting studies of the distribution of sulphur in the coal. The discussion by Charles Catlett of the coking and steaming qualities of the New River-Pocahontas-Gauley-Coals (pp. 679-689) and by E. V. d'Invilliers of the coals of the Gauley Coal Land Association lands (p. 630-655) will also be particularly welcome.

The Barnesboro-Patton Coal Field of Central Pennsylvania. By J. S. Burrows. *The Elders Ridge Coal Field.* By R. W. Stone. *Coal Mining Along the Southeastern Margin of the Wilmore Basin, Cambria County.* By Charles Butts. *Meadow Branch Coal Field of West Virginia.* By M. R. Campbell. Bulletin 225, United States Geological Survey, pp. 295-344.

These papers are brief advance statements of the results of recent geologic work in the northern Appalachian coal fields. The details are mainly stratigraphic.

BOOKS RECEIVED.

In sending books for notices, will pubishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

South Australia. Annual Report of the Moonta School of Mines. 1903. Moonta, S. A.; published by the School. Pages, 88; illustrated.

A Statistical Account of Australia and New Zealand. 1902-3. By T. A. Coghlan. Sydney, N. S. W.; Government Printers. Pages, 968.

Western Australia. The Northwestern Goldfields, from Kookynie to Laverton. Perth, W. A.; *The Morning Herald.* Pages, 44; illustrated.

Report of the Board of Trade of Rossland, B. C.. 1903-4. A. H. MacNeill, President. Rossland, B. C.; published by the Board. Pamphlet, 12 pages.

The Cement Age. By Robert W. Lesley. Philadelphia; reprinted from the *Proceedings* of the Engineers' Club of Philadelphia. Pamphlet, 8 pages.

Twelfth Biennial Report of the Bureau of Labor Statistics of Illinois. 1902. David Ross, Secretary of Board. Springfield, Ill.; State Printers. Pages, 606.

Annual Report of the Director of the Mint for the Fiscal Year Ending June 30, 1903. George E. Roberts, Director. Washington; Government Printing Office. Pages, 294.

Ready Reference Tables. Volume I. Conversion Factors. By Carl Hering. New York; John Wiley & Sons, London; Chapman & Hall, Ltd. Pages, 216. Price, $2.50.

The Progress of Gold Mining in Kalgoorlie Western Australia, in 1903. By E. Barton Hack. Denver, Colo.; the Colorado Scientific Society. Pamphlet, 24 pages.

Radio-Activity. By E. Rutherford. Cambridge, England; the University Press. New York; the Macmillan Company. Pages, 408; illustrated. Price, $3.50, net.

Recursos Minerales de la Provincia de Huanaco, Peru. By Nicanor G. Ochoa. Lima, Peru; published by the Corps of Engineers of Mines. Pages, 44; illustrated.

New York State Museum. Bulletin 56. Description of the State Geologic Map of 1901. By Frederick J. H. Merrill. Albany, N. Y.; University of the State of New York. Pages, 36; with maps.

Report of the United States Commissioner of Fish and Fisheries. 1903. *Part XXIX.* George M. Bowers, Commissioner. Washington; Government Printing Office. Pages, 144.

Geological Survey of Newfoundland. Report on the Mineral Resources of the Island for the Year 1903. By James P. Howley. St. John's, Newfoundland; published by the Survey. Pages, 20.

The Production of the Precious Metals in the United States, During the Calendar Year 1902. By George E. Roberts, Director of the Mint. Washington; Government Printing Office. Pages, 392.

The Theory of the Lead Accumulator (Storage Battery). By Friedrich Dolezalek. Translated from the German by Carl L. von Ende. New York; John Wiley & Sons. London; Chapman & Hall, Ltd. Pages, 252; illustrated. Price, $2.50.

BOOKS REVIEWED.

Geologic Atlas of the United States. No. 103. *Nampa Folio, Idaho-Oregon.* Washington; engraved and printed by the Geological Survey. Two maps and 6 pages text. Price, 25 cents.

This folio describes the Nampa quadrangle, an area 34.5 miles long and 25.1 miles wide, embracing a large part of Cañon county and small parts of Ada and Owyhee counties, Idaho, and a few square miles of Malheur county, Oregon. The quadrangle is near the lower end of the great Snake River valley, which is here 35 to 45 miles wide. The area lies in the arid belt, the normal rainfall at Nampa being about 10 in. and the entire quadrangle might be characterized as a sage brush desert.

The geological formations are of Tertiary and Quarternary age. The former include lake deposits, parly of Eocene age (Payette formation) and partly Pliocene (Idaho formation) and surface flows of rhyolite, of Eocene or pre-Eocene age, and basalt of Pliocene age. The Quarternary rocks are river gravels and loams.

A little placer mining is done along the principal streams, the production of gold in Cañon county being $7,000 to $10,000 a year. The gold along the Snake is exceedingly fine or floury, and occurs in thin and not very persistent pay-streaks in the sands.

Clarence King Memoirs and the Helmet of Mambrino. Published for the King Memorial Committee of the Century Association by G. P. Putnam's Sons; New York and London. Price, $2.50.

This is a handsome volume prepared by the friends of Clarence King as a memorial to his life and character. The first 35 pages are given to King's fanciful sketch of an experience in Don Quixote's land, which appeared in the *Century Magazine* in 1886. Then follow recollections and tributes by James D. Hague, John Hay, William Dean Howells, Henry Adams, S. F. Emmons, R. W. Raymond and others. This is the kind of book that the reviewer reads right through from first to last; for, indeed, it is aglow with warm sentiment and keen human interest throughout its 400 pages. Many men have left more complete records of scientific achievement and literary acomplishment, but to few has it been given to leave so fine a heritage of affectionate regard as did Clarence King. Some men exert influence through ability or energy, but, while

the subject of this memoir evidently possessed both of these qualities, he was endowed in overflowing measure with one other which fused them into conquering power, and that was kindness. His was a glowing character, full of color, and surrounded by an atmosphere of romance. He won men with ease, and used that power to good purpose. The first transcontinental surveys under the 40th Parallel expedition, and the subsequent creation of the United States Geological Survey are monuments to his organizing ability. It is just the spirit of such men as he that is most needed to-day, when commercialism and a commercial kind of politics tend to bring everything down to their dreary level. To those who want to get into a fine stimulating air, such as that of the mountains which King scrambled over in the enthusiasm of his lusty manhood, and to those who desire occasionally, at least, to feel the warmth of essential humanity when at its best, the reviewer commends this book.

United States Geological Survey. Mineral Resources of the United States, Calendar Year 1902. Prepared under direction of David T. Day, Chief of Division of Mining and Mineral Resources. Washington, 1904: Government Printing Office. Pages, 1038.

In France and Germany one does not expect to receive the completed volumes of mineral statistics until two years or so after the end of the period to which they relate. The French chief of bureau and the German professor require time to do their work, to go into all the refinements possible, and to adjust balances. Their work must be gone over and carefully pondered before it is launched upon an incautious world. The balance of trade—and who knows what else—might be upset, if people knew too much, or knew it too soon. In this country, however, we are used to speedier ways; we want information promptly, when it is of some use. It gives one rather a shock, therefore, to receive the familiar looking volume of the 'Mineral Resources,' well on toward the middle of 1904, and to find, on opening it, that it gives only the statistics for 1902. The critic to whom it is passed over approaches it with a certain respect; it is as if he had been called upon to review Gibbon's 'Decline and Fall of the Roman Empire,' or Adam Smith's 'Wealth of Nations.' The reverence for age, which is felt by all well-constituted minds, must interfere to some extent with his critical acumen.

Seriously speaking, the delay in the issue of this volume much impairs its usefulness. Six or eight months ago it would have been a welcome visitor, but at this day it is apt to be consigned to an upper shelf. It is true that some of the articles were issued earlier, in pamphlet form; but they related, with one or two exceptions, to materials of minor value and importance. The lack of timeliness is more to be regretted, as the volume contains some valuable and interesting articles, but many of them have really been anticipated elsewhere. Thus Mr. Swank's important article on iron and steel was accessible in his report to the American Iron & Steel Association last July. It is the most complete and satisfactory article in the book, but its appearance now seems a little superfluous.

It is impossible to mention all the articles contained in this volume, but a few of the more prominent may be briefly reviewed Perhaps the most elaborate and carefully prepared are those by Mr. F. H. Oliphant on petroleum and natural gas, and Mr. L. L. Kimball's on cement. The former would have been improved by a rather severe pruning. Mr. George F. Kunz is always interesting when he writes on precious stones, and this present article is no exception. The article on copper has been re-cast since the preliminary publication of its figures, much to its benefit. That on lead makes, we think, a mistake in its estimate of stocks and production, as well as in the disposition of foreign material. The paper on zinc makes no mention of the Wisconsin mines—but we are forgetting the date of the report. Mr. George E. Roberts' article on gold and silver is one of the shortest in the book, consisting almost entirely of tables. It is unfortunate that the Mint still feels obliged to adhere to the coining value of silver, which adds a misleading column to the tables. Otherwise, Mr. Roberts' article is compact and satisfactory. Mr. Birkinbine's article on iron ore is less discursive than usual; it labors under the same difficulty as others; its facts were all at the service of the trade a year ago, chiefly through the enterprise of our alert contemporary, the *Iron Trade Review.*

Mr. E. W. Parker's coal article is an elaborate presentation of the coal and coke production, which contains much that is of value, though it could have been much more serviceable to the general reader by a condensation of the tables and the omission of a number which present facts of only local interest. Thus the tables of output by counties, in a number of States, would be well enough in the State reports; in this they only make it difficult to find more important matter. Mr. Parker's brief comments on the anthracite strike are careful and judicious, as might be expected from his position as a member of the Strike Commission.

To sum up briefly an impartial opinion of the book, the reviewer is obliged to say that it contains much that is valuable; but if it had been made half its present size and had been issued ten months earlier, it would have had much more than twice its present value.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Letters should be addressed to the Editor.

We do not hold ourselves responsible for the opinions expressed by correspondents.

A Disclaimer.

Sir:—Several of my English correspondents and friends have called my attention to La Luz Tunnel proposition of Guanajuato, Mexico, which is being floated in London on the reports of J. M. Wiley and brother. I am an officer in a company owning the Nueva Luz claim in the Guanajuato district, and the coincidence of name is peculiarly unfortunate, as I have no connection with and no knowledge of La Tuz Tunnel proposition. The further fact that my foreign friends know me as Capt. Wiley, a title acquired in the Marine service, and as the engineer for the Tunnel company is also designated by the same title, makes it doubly necessary for me to disclaim any relationship with the enterprise.

W. MURDOCK WILEY.

New York, May 16, 1904.

The Philippine Islands.

Sir.—I would like very much to call the attention of Americans, through your columns, to the neglect with which these islands are treated, not only by the Government, but by the people of the United States. We have spent, and are spending, a great deal of money in governing these islands, but our people at home apparently do not care about them, or think of them at all. In the way of trade, or in utilizing the varied mineral resources, little or nothing has been done. I do not believe in exploiting the islands—that is, plundering them—for the benefit of a few companies or syndicates; but a better knowledge of them might be of great service to Americans interested in mining and metallurgy, and of great benefit to the Filipinos themselves.

How much has been done in the way of exploring the islands, or af ascertaining anything about their economic geology? The United States Geological Survey seems to be too busy with outside work, and contests over soft places in Washington to look this way. Except for a couple of brief and unsatisfactory reports, it has done nothing for this great territory. The Insular Mining Bureau has done what it could—some excellent work is to its credit already, and its officers are trying hard to do more. The Bureau, however, is tied up by lack of men and means, and its work is necessarily on a limited scale. If the United States Survey cannot spare any time for the Islands, they ought to have a Geological Survey of their own, with sufficient means to make at least a fair beginning of the work. Apart from its economic service, such a survey would have much scientific interest and value. On the economic side alone it would be a most interesting work.

There is another point to be considered. We need not suppose that everybody is as blind as ourselves. While we are neglecting the Philippines, Englishmen and Germans are taking advantage of the opportunities which our work and expenditure are presenting to them; while they laugh among themselves at our folly. There is no reason, for instance, why the iron and steel used here should not come from the United States, or be made in the Islands. In fact, nearly all of it comes from Germany and England. When Americans wake up—if they ever do—they will find the trade and the mineral resources of the Islands so firmly held by foreigners, that it will be very difficult for them to find a place.

Americans used to have a reputation for progressiveness—and enterprise. In the case of the Philippines they have shown themselves "dead slow." Can any amount of urging wake them up? FILIPINO.

Manila, P. I., April 25, 1904.

In Defense of Admiral Melville.

Sir.—I have read with interest your editorial in issue of May 5th, headed 'The Shoemaker to His Last.' I am handling the stock of the company with which Admiral Melville is connected, but outside of this fact I desire to take exceptions to some of your conclusions. I have not the pleasure of knowing Admiral Melville and do not know what his explanation will be in reply to your correspondent's criticism, in what I conceive to be rather strong language, namely, "I think this is a prostitution of Admiral Melville's position and reputation." As I understand the case, Admiral

Melville has associated himself with sixteen professional gentlemen and other parties, all of whom have made a success in their respective callings. Each one's training has been such as to make his opinion of value on some part of the work necessary in a development company of this magnitude.

In the circular letter probably referred to, although the admiral uses the language, "I have recently examined and reported professionally on the first property, etc," he follows it up later in the same letter with the statement that "the inspection which was made by our expert mining engineers, Messrs. Spilsbury and Tays, as to the technical, geological and mining features; and by myself, in their company, as to the general survey of the whole situation, from an engineering point of view, was most thorough and exhaustive." My inference from this language is, that he relies on the expert mining engineers for the value of the property from a technical, geological and mining standpoint.

I think the statement, "It was believed that the high standing and degree of success attained in their various special lines, by the twenty-one organizers and directors, would attract investors to the company to such an extent that all the capital required would be available," made by the company in its literature given to the public, states as plainly as language can, why Admiral Melville is connected with the company. If your correspondent had informed himself in what manner Admiral Melville was connected with the company, instead of hastening to criticize from a part of the literature issued, I do not think he would have been so hasty to condemn the company's use of the admiral's name.

Your correspondent may not be informed as to how extensive the admiral's investigation has been, or what his general knowledge may be on the subject of mining, even though he has been engaged for years in another line of engineering work. Your correspondent does not mean to infer that because a man has attained eminence in his profession or been "in the public eye," that he must not take the responsibility of calling the attention of his friends and the public to an enterprise in which he has put his own money and in which he has faith. If your correspondent had been expressing his opinion upon a general proposition and had not named a specific case, there might have been some force to his argument. Certainly Admiral Melville, in advising the public to put their money in mining properties, is advocating a line of investments which statistics and the mercantile agencies have proved has been, and is now, the most profitable in existence.

Certainly you would not ask the public to believe that the admiral was not competent to advise on any proposition in which power development for any purpose is involved, nor can I believe that you would argue that one, to be a prudent adviser of what constitutes a safe and profitable investment, should not be a lawyer, a railroad president or employed in numerous other lines that could be mentioned, or that no one but a minister should discuss theology.

To my mind, it is not always necessary that one be educated in a particular line of work to make a success in it. I dislike to use my own experience to illustrate my reason for this statement, but it is the strongest one that presents itself. When first employed in the office of a company furnishing a municipality its water supply, I knew no more about machinery and the water works business than a farmer, but my general business training had been such that in a short time I was put in absolute control of property valued at $700,000. It might have been urged at that time that this was an unwise move for the owners of the property to make, but by availing myself of the best legal talent, when a law point was involved, and of the best advice to be obtained from hydraulic engineers of high standing when construction and maintenance problems arose, it was conceded by those competent to judge, that I made an unusual success of the property in my charge in view of the many complications and problems that had to be met.

Having spent many years in the water works business and given up the same to interest the public and my friends in mining investments, it might as well be argued in my case, as in that of Admiral Melville, that my experience does not make me a safe man to follow in mining investments. His knowledge of mining matters may have been gained as mine has been. For over twenty years I have been informing myself from reliable sources of the merits and pitfalls attached to the mining industry, and having made during that period both successful and unsuccessful investments in mining properties and companies, and paid in cold cash for my experience, it may prove that I am in a better position, when assisted by competent and reliable mining engineers, to advise on mining matters than would be generally conceded.

My observation has been that mining engineers seldom take any part in financiering a property. I know of one very eminent mining engineer and geologist who has made it a rule all his life not to invest his own money in any property upon which he has reported, and, while he has made millionaires of others, he only profited by his good judgment to the extent of his fees for examination.

It is hardly fair to draw a comparison between "the sad story of the Marquis of Dufferin and other Englishmen" and Admiral Melville's position in the company under discussion. If I understand the English case, the gentlemen who allowed their names to be used did not visit the property in person nor could they have sufficiently investigated the character of the management at the operating end, and the ability and reliability of the engineers who passed upon the merits of the property, or the result would have been different.

The company whose merits the admiral is advocating was launched so that none of the promoters, including himself, obtained any of the preferred stock except by purchase for cash at par; and their first profits must come by making the preferred stock valuable to the public, who now purchase, as well as to themselves, while any further profits must come from the value which the common stock may acquire, and this common stock the public also receives when purchasing the preferred stock.

Your statement, "A mining engineer's valuation of a battle-ship is not often asked by a naval board" is undoubtedly true, but it does not follow that a mining engineer, after hearing the testimony of reliable naval and marine experts, would not be a good judge of what is the valuation of a battle-ship.

FRED CROSBY.

New Orleans, May 17, 1904.

ABSTRACTS OF OFFICIAL REPORTS.

Copper Range Consolidated Company.

This company is a holding company, having a capital stock of $38,053,200. Its property includes 99,659 shares of the Baltic Mining Company, 99,674 shares of the Copper Range Company, 95,532 shares Trimountain Mining Company, $1,281,200 stock and $615,000 bonds of the Copper Range Railroad Company. The Baltic and the Trimountain companies own large mining properties. The Copper Range Company's property consists of 50,000 shares, or one-half the stock of the Champion Copper Company, and $2,605,100 stock of the Copper Range Railroad. The other half of the Champion stock is owned by the St. Mary's Mineral Land Company.

The Baltic, Champion and Trimountain are three new mines, on the South Range of the Lake Superior Copper district. The accompanying map shows the relative position of the three mines. The Copper Range Railroad was built to connect the new mines with the existing roads of the district. The report covers the year 1903.

The copper mined and sold during the year, with the average prices realized, was as follows:

	Pounds.	Cts. per lb.
Baltic	10,580,997	13.431
Champion	10,564,147	13.370
Trimountain	9,237,051	13.215
Total	30,382,195	13.345

Part—1,213,955 lb.—of the Trimountain copper was not sold until after the close of the year.

A summary of results from the mines operated is as follows:

	Baltic.	Champion.	Trimountain.
Rock stamped, tons	490,237	389,082	507,377
Fine copper, lbs.	10,580,997	10,564,147	9,237,051
Copper per ton, lb.	21.58	27.15	18.20
Copper, per ton, %	1.08	1.36	0.91
Cost per ton stamped.	$1.537	$2.066	$1.970
Cost per lb. copper, cts.	7.12	7.61	10.82
Development, feet	6,669	8,342	6,647

Costs do not include taxes, nor general expenses for the year.

The income account of the Copper Range Consolidated Company is stated as follows:

Copper sold	$4,054,634
Mining, smelting, etc.	$2,700,647
Taxes and interest	167,932
Total expenses	$2,868,579
Mining profit	$1,186,055
Net earnings, Copper Range R. R.	116,584
Net receipts, Copper Range Co.	143,204
Interest account	60,735
Received under Trimountain agreement	133,032
Total net	$1,639,610
Dividends, Champion Co.	$300,000
Dividends, Trimountain Co.	300,000
Taxes on stock, etc.	23,702
One-half undivided profits, Champion Co.	133,763
Total charges	$757,465
Net balance	$882,145

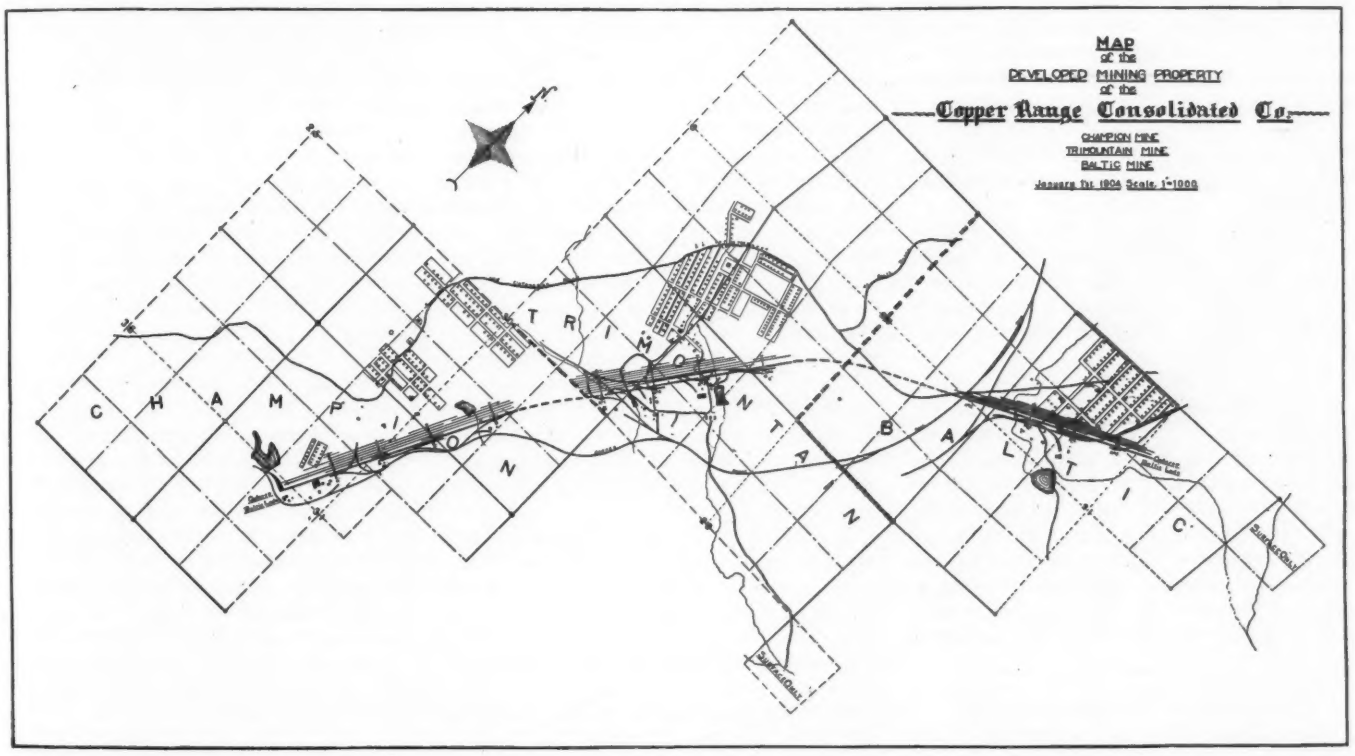
The half profits of the Champion Company were paid to the St. Mary's Mineral Land Company, as half owner.

The directors' report says: "Under the terms of the circular of September 11, 1903, to the Trimountain stockholders 95,532 shares of our stock have been issued for an equal number of shares of the Trimountain Mining Company and 4,468 shares are still outstanding. When the Copper Range Consolidated Company was planned, it was expected that the organization would include the Trimountain Company, but as the owners of a controlling interest in that company were unable to come to an agreement with us as to the basis on which the Trimountain should be taken in, the

Consolidated Company was organized without it. Negotiations were carried on, however, periodically, at the instance of the Trimountain people, but never with success, because of the unwillingness of the Copper Range Consolidated Company to concede more to the Trimountain than was conceded to the Baltic Company. In August of 1903, the matter was again taken up and after a full examination of the Trimountain mine and its equipment, an agreement was entered into between your company and the holders of more than 70,000 shares of Trimountain, whereby it was agreed to purchase the Trimountain Company on a basis of an exchange of one share of Consolidated Company for one share of Trimountain, the majority holders agreeing absolutely to the exchange, subject, of course, to the approval of the stockholders of this company; and it was further agreed to offer the same sum, $2,000,000, is not greater than has been expended in the development and equipment of the Baltic and Champion mines. The mistake which was made by the Trimountain Company was in declaring dividends prematurely.

"In the matter of permanent equipment both of the mine and mill the Trimountain is not second to either the Champion or the Baltic. Some modifications of the method of mining were adopted by our agent, Mr. F. W. Denton, because of the excellent results he had accomplished by the filling system at the Baltic where conditions were similar to the Trimountain. It was calculated when we took possession that it would take about six months to make these changes and bring the mine to its normal production. During these six months we have determined to our satisfaction that the Trimountain is as rich a mine as the Baltic, and from now on we are confident the mine gineer. The plans call for the completion of the plant so as to begin smelting July 1, 1904, and notwithstanding the extraordinarily adverse weather conditions which we encountered soon after starting and which have been constantly against us, we have every reason to believe we shall be able to smelt by June 1, and to handle the product from all the mines by July 1. In all details of construction, advantage has been taken of every modern device known to the art, which will contribute to the economy or efficiency of the operation. We confidently expect to obtain a finer smelted product, and we are certain that our cost of smelting will be very greatly reduced. The total cost of the smelter will be in the vicinity of $500,000.

"The net profits of the Baltic Mining Company for the year were $481,447, of which $305,000 was required to repay advances made



terms to all the stockholders for a period of 30 days thereafter.

"An examination of the Trimountain books showed a net indebtedness on September 1, 1903, of about $840,000, but it was one of the terms of the agreement whereby the exchange of shares was made, that the parties owning the majority interest of the Trimountain Mining Company should pay to the Copper Range Consolidated Company a sum equal to the entire amount of this indebtedness. In pursuance of this agreement there has been paid on the principal to December 31, 1903, the sum of $133,031.63. which amount has been credited to profit and loss. While the indebtedness of the Trimountain Company seemed large, a thorough examination showed that the money had all been honestly and legitimately expended in the development and equipment of the mine. The total amount of cash available from assessments over and above what was required for the original purchase of the property was $1,200,000, which, added to the indebtedness, would leave approximately $2,000,000 in cash to represent the development and equipment of the mine as it stood September 1. The net profits from mining operations up to that date had all been distributed in dividends. This will show a production and yield equal to what we have been getting from the Baltic.

"It has been recognized that the best results would be obtained from a smelter operated under the direction and control of the producing companies. It was also recognized that the largest possible tonnage for the operation should be secured to obtain the lowest smelting cost. In carrying out this idea it was arranged that Mr. John Stanton, representing the Wolverine, Mohawk and Atlantic mines, should organize a company under the general laws of Michigan, called the Michigan Smelting Company, 40 per cent of the stock of which was subscribed for by the above three companies and the remaining 60 per cent by the Champion, Trimountain and Baltic Companies, and there are no other stockholders. A very favorable side-hill smelter site, located at the mouth of Cole's Creek, on Portage Lake, was acquired from the Atlantic Mining Company, and a connection with the smelter was made by the Copper Range Railroad.

"In February, 1903, Mr. F. I. Cairns, formerly superintendent of the Anaconda smelter, was engaged to prepare plans and to take charge of the construction and operation. Mr. Frank Klepetko was retained as consulting en- by the Consolidated Company in 1902, and $83,818 for new construction. These results were obtained from an average stamping of 1,630 tons per day. The estimates for additions to plant for the coming year include a permanent hoist at No. 5 shaft, also 10 more double dwellings, at a total cost of about $50,000. Within two years, if present conditions south of No. 2 shaft hold, a new shaft will be needed, also additional mill capacity and a compressor.

"The net earnings of the Champion Copper Company were $567,526, and there was paid in dividends $300,000, of which amount your company received half, and the St. Mary's Mineral Land Company the other half; the balance of the earnings were expended for new construction. Owing to the long delay in the delivery of the new compressor and boilers, the output from the mine has averaged only about 1,150 tons per day, which, with about 50,000 tons from the rock piles, made a daily stamping of about 1,300 tons per day. The compressor is now, however, fully installed, the boilers are on the way, or at the mine, so that by June 1 the compressor should be in commission, and the daily output equal to the present mill capacity of 2,000 tons. The estimates for new

construction for the year include a new hoist at D shaft and an addition to the mill, equal to two more heads, increasing its capacity to 3,000 tons per day, which the mine is now able to supply.

"The net earnings of the Trimountain Mining Company for the year were $138,543, in addition to which we received under the agreement before referred to $133,031, a total of $271,574. No large outlay for construction will be necessary for some years unless it should be deemed advisable to enlarge the stamp mill.

"The net earnings of the Copper Range Railroad over and above interest charges, for the year ending December 31, 1903, were $116,584.01, and would have been materially larger from all sources had anticipations of increased rock shipments from the mines been realized. Construction account for extensions and other new mileage is now completed, for the present at least, and except for additions to equipment as the business may from time to time demand, there are no immediate construction items to be provided for; $615,000 of the first mortgage bonds of the railroad company, issued at the rate of $20,000 per mile of completed road, are in the treasury of the Consolidated Company, and can be sold at any time it is considered advisable.

"On January 1, 1904, Mr. John M. Wagner was appointed purchasing agent for the entire Copper Range Consolidated Companies. We expect from this centralization of the purchasing department considerable economies in all the various operations.

"Leaving out entirely the operations of the Trimountain Company, the net earnings for the last year were $911,145, a little more than $3 per share on the former capitalization. The amount required for the construction of the new smelter, together with the cost of the railroad construction in excess of the estimates, and the acquisition of the Trimountain Company make it necessary to accumulate working capital, and it was therefore considered advisable to abandon the idea of dividends in 1903."

Tonopah Mining Company of Nevada.

This company owns eight mineral claims in the Tonopah mining district of Nye county, Nevada, comprising the discovery locations of J. L. Butler. The capital of the company is 1,000,000 common shares and 300,000 in 8 per cent preferred; par value $1. The report for the year ending February 29, 1904, shows: Receipts from smelter for ore, $598,224; royalties, $12,430; other receipts, $4,821; total, $615,475. Expenses for mining superintendency, engineering, machinery insurance, taxes, freights at Tonopah, were $480,405; rent and expenses at Philadelphia office, $4,281; salaries and clerk hire, $14,715; adjustment of outside claims, $4,010; interest on preferred stock, $23,964; legal expenses, $27,297; taxes and insurance, Delaware State, $650; surety bond, $350; railroad construction account, $29,880; proportion due lessees on ore shipped smelter, $1,969; total, $587,520. The net balance for the year was $27,955, to which is to be added balance of $187,329 brought over from previous year; making a total of $215,284 on hand at the close of the year.

The director's report says: "The fiscal year has been one of great importance in the development of the property of this company. The location at so great a distance from the lines of transportation and the smelters necessitated a careful study of the mines before determining the means to be provided for the conversion of its products into money, and the extent to which the company would be justified in incurring expenditures for that purpose. A month prior to the commencement of the fiscal year, the development of your property had been placed under the supervision of Mr. John Hays Hammond, as consulting engineer, and during the year the following amount of underground work has been done under his direction: 1,884 ft. of sinking, 4,631 ft. of drifting, 2,028 ft. of cross-cutting, 286 ft. of raising, 22,687 tons of waste hoisted; 15,294 tons of ore hoisted, 4,066 tons of ore shipped, 11,228 tons of ore placed on dump.

"The practical testing of the ores to ascertain the most economical process of reduction has been conducted both at the mines and at Denver and elsewhere. So long as the ores remain of their present character a simple process will suffice, but if changes occur in depth the problem is less easily solved.

"There are still under consideration processes, which it is deemed advisable to investigate before incurring the expenditures incident to the erection of a mill, for which a site, and what is believed to be an ample supply of water have been obtained on the line of the railroad now under construction. The development work upon your mines was temporarily suspended, because the amount of ore mined and piled ready for shipment and blocked out underground was sufficient to justify the economy of postponing further work, until the advent of railroad transportation shall have reduced the cost of fuel and all other incidents to operation. Consequently, from January 1 to the close of the fiscal year, February 29, the operations have been restricted to the shipment of such quantities of high-grade ores as could be transported on a favorable basis of cost.

"A contract has been made with the American Smelting & Refining Company for the sale by your company of 100,000 tons of ore, with the option upon the part of the purchaser to take an additional 50.000 tons upon a basis, both of smelting charges and transportation, which will enable your company to realize from the medium grades of ore produced from your mines a greater net result than could be obtained by milling under any of the processes yet proven. The operation of the contract will, in all probability, begin to show the anticipated results commencing with the month of June.

"The construction of the Tonopah railroad was undertaken by your company after careful investigation and consideration of the advantages to accrue to your company; the rapid development of other mines in the locality also tending to indicate that, apart from your company's shipments, a large tonnage would be offered as soon as it could be transported.

"The railroad will be 60 miles in length, from the junction with the line of the Southern Pacific Company to Tonopah; is 3 ft. gauge, corresponding with the gauge of the line with which it connects, and is being laid with 50-lb. rails and furnished with heavy equipment. The grade, except for a short distance, is uniformly favorable to the traffic from the mines, the maximum being 2.14 per cent, or 113 ft. to the mile. For the present requirements, three locomotives and 35 freight cars have been provided. The first 20 miles was put in operation on April 16, and it is expected that during the month of May the remaining mileage will be completed sufficiently to be opened for shipment of ores.

"Since the close of the fiscal year Mr. F. J. Seibert has resigned as superintendent, and Mr. F. A. Keith has been appointed general manager and superintendent. Mr. T. L. Oddie has been appointed general agent.

"A special meeting of the stockholders of the company will be called at an early date to take action upon the reduction of the capital stock of the company antecedent to the retirement of the outstanding preferred stock."

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Restoring Amalgamating Plates.—I desire to learn the best method for treating silver-plated copper amalgamating plates so as to restore the copper patches without having the entire plates re-silvered.—E. W. A.

Answer.—In default of having your plates re-silvered, which would be the usual course to pursue, you can 'sweat' your plates and get rid of the patchy surface of silver-plating, and then, having a clean fresh copper surface, rub in mercury and so obtain a good amalgamated copper surface which, when once secured, is about as good a gold-saver as the silver-plating.

Breaking Up of Furnace Sows.—We are anxious to find some way of cutting large sows of black copper into pieces of manageable size. It is too expensive to break them up by hand, as they are a foot thick in parts and 8 ft. in diameter, and powder cannot be used economically for the purpose. I believe that large pieces of iron have been cut by means of the electric arc; is this method practicable in the case of copper, and, if so, how can it best be carried out? We have a direct current generator of 700 amperes and 250 volts and an alternating current generator of 2,300 volts.—C. B. N.

Answer.—If any of our readers can answer this inquiry, we shall be glad to have them do so in our columns. We can find no information on the subject in the literature dealing with the metallurgy of copper or other metals.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

STATEMENTS IN COMPLAINT MUST BE SUSTAINED BY PROOF ON TRIAL.—Where, in action by a miner for injuries, the negligence alleged is that the company furnished an appliance insufficient for the purpose for which it was used, in that it was made of cast steel when it should have been made of malleable iron, the miner fails to make out a *prima facie* case unless he introduces evidence that it was of cast steel.—Breeden v. Big Circle Mining Company (76 *Southwestern Reporter*, 731): Court of Appeals of Missouri.

NEW NOTICES AS TO "LODE DISCOVERY" NOT NECESSARY AGAINST ONE WHO HAS NEVER PERFECTED HIS OWN CLAIM.—Where parties filed only one location certificate, making their claim to a lode depend on a discovery admitted by them to be invalid, their claim is inferior to that of a party who bases his claim on a discovery in another and adjoining shaft, earlier

in point of time of a similar claim, the other having filed an amended location certificate basing his right on such discovery, though neither posted at the point of discovery a location stake or notice, as required by law. It is not necessary for the claimant to a mining lode location to post new notices at the point of a second valid discovery in order to perfect his claim, as against the claim of one who has never perfected any claim.

Their grantor, as locator of a mining lode, went on the ground of two abandoned claims, and proceeded to re-locate as an abandoned claim the territory covered by them. He sunk a discovery shaft, and in due time filed for record his location certificate, in which the discovery was designated as in the shaft, where there was in fact no discovery. The court held that, though such locator knew of the existence of a vein within the limits of his claim, but did not adopt such discovery as his own and base his location on it, his grantees could not maintain an action in support of a claim to same.—McMillen v. Ferrum Mining Company (74 *Pacific Reporter*, 461); Supreme Court of Colorado.

"Available Coal" Includes Underlying Coal Though Its Mining Is Costly.—A contract for the sale of coal provided that all coal and surface land to be conveyed should be surveyed, and for any number of acres of coal not delivered, there should be deducted $250 per acre from the consideration of coal, and $100 per acre for surface; and a schedule was attached headed "The property included in the coal mine or coal mining plant hereinbefore referred to is substantially as follows" and after citing several items, the following was mentioned "Coal unmined, about 3,500 acres available coal." Out of the entire acreage 38 acres had been mined by the grantors, and it was agreed that $250 per acre should be deducted for this deficiency. A railroad had been constructed over the land, and a creek ran through it. The coal, both under the creek and the railroad, could be mined by leaving proper supports, at a greatly enhanced cost. It was held by the court that the coal under the creek and the railroad was "available coal" within the meaning of those words as contained in the contract, whether it could be mined or not.—Re Redstone Oil, Coal & Coke Company's Dissolution (56 *Atlantic Reporter*, 355); Supreme Court of Pennsylvania.

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

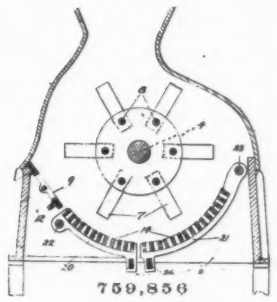
The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the Engineering and Mining Journal upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the Journal in which notice of the patent appeared.

Week Ending May 17, 1904.

759,884. CONVEYER.—Stacy B. Hart, Peoria, Ill., assignor to the Hart Grain Weigher Company, Peoria, Ill. A main conveyer-tube provided with a shaft positioned therein carrying a conveyer-worm, and means for rotating the shaft.

759,886. HEAD FOR MARBLE OR GRANITE POLISHING MACHINES.—Harry J. Higgins, Denver, Colo. A head for machines of the class named comprising a plate, frames pivoted to the under side of said plate, polishing-blocks secured to said frames and channeled lugs located on the upper side of said plate.

759,856. PULVERIZER, BREAKER, OR DISINTEGRATOR.—George W. Borton, Philadelphia, Pa. The combination of a housing, a rotatable shaft provided with pivotal hammers, a concave cage pivoted at one end and clear of the housing at the other



759,856

end, and adjustable means consisting of a rigid support for the free end of the cage, whereby the cage can be adjusted toward the hammers to compensate for wear upon both the cage and the hammer ends.

759,887. PROCESS OF MANUFACTURING PEROXIDES.—Friedrich Hinz, Berlin, Germany. A process for the electrolytic production of the peroxide of magnesium and of zinc in an electrolyzer having a porous diaphragm separating the anode-compartment from the cathode-compartment, which consists in charging the anode-compartment with an aqueous solution of the corresponding metallic chloride and the cathode-compartment with a neutral aqueous solution of the same chloride and of hydrogen peroxide, and passing an electrolyzing-current through the said solutions.

759,901. CABLEWAY.—Thomas S. Miller, South Orange, N. J. In a ropeway, in combination, a traction-rope having an outward and an inward run, an actuator for the said rope, a tension device for said rope, a carriage provided with a wheel resting on one of the runs of said traction-rope and with means engaging the other run thereof and a hoisting-rope extending to said carriage.

759,910. ELECTRIC SEPARATOR.—Alonzo H. Perry, St. Louis county, Mo. In an electrical separator, the combination with a receiving-plate adapted to receive a charge of static electricity, of a source of electricity for charging said plate, a pivoted inclined feed-plate within the inductive influence of said receiving-plate, mechanism for vibrating said feed-plate, and means for preventing the contact of the metallic particles with said receiving-plate.

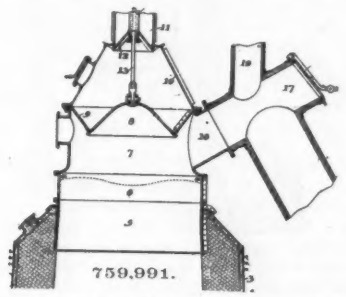
759,931. APPARATUS FOR DRESSING CRUSHING-ROLLS.—Thomas L. Sturtevant, Quincy, and Thomas J. Sturtevant, Wellesley, Mass., assignors to the Sturtevant Mill Company, Portland, Me. The combination with a crushing-machine and a turning-tool device adapted for attachment to a stationary part thereof in position so that the turning-tool may engage a crushing roll or tire, of a power-shaft from which the crushing-machine is driven, and which is so belted to the pulleys of the crushing-rolls as to drive the rolls in opposite directions with their tops turning toward each other, and a driving-pulley loose on said power-shaft, a clutch device by means of which said pulley may be connected with said shaft when the crushing-machine is to be run at crushing speed, and a reducing-gearing connecting said loose pulley with said shaft when a roll or tire is to be dressed by said turning-tool device.

759,938. COMPOSITION FOR PRESERVING WOOD.—William B. Taylor, Winterpark, Fla. A composition for the purpose described, composed of glue one part, plaster-of-paris two parts, resin five parts, and tar two parts.

759,984. ROLLING-MILL.—Jerome R. George, Worcester, Mass., assignor to Morgan Construction Company, Worcester, Mass. A rolling-mill, consisting of a pair of two-high rolls having a series of grooves or passes for the continuous reduction of an ingot, a straight conveyer by which an ingot can be presented to a portion of the passes in opposite directions, and one or more curved repeaters connecting the remaining passes in consecutive order, with one of the passes of the rolls arranged to receive an ingot from said conveyer and deliver it to one of said curved repeaters.

759,988. RETORT.—Snyder L. Hague, Salt Lake City, Utah. An apparatus for extracting oil from shale comprising a horizontal retort, a furnace beneath one end of said retort, a series of connected flues extending beneath said retort from the furnace to a smoke-vent, air-valves in said flues, a revolving conveyer to move the shale from the cooler to the hotter end of said retort and a steam-jet to drive the vapors from the hotter toward and out through a vent in the cooler end of the retort.

759,991. BLAST-FURNACE.—George K. Hamfeldt, Munhall, Pa. A blast-furnace having an annular metal shell with its lower portion within the upper part of the masonry stack, said shell being extended



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above said stack and having its upper portion where the dropping charge strikes it of smaller diameter than the internal diameter of the top of the stack proper.

760,010. STAMPING MILL.—James H. Montgomery, Denver, Colo. In a stamping-mill an annular revolving mortar fitted inside with removable wearing-dies, having depressions or pockets in them, a

760,010.

stamper fitted with removable stamping-shoes, adapted to mesh into the pockets in the dies when the mortar is revolved, a feed-hole in the center of the head and a screen attached to the mortar, and revolved with it, through which the material is discharged when crushed fine enough.

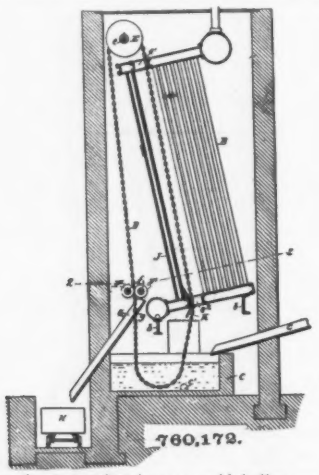
760,023. APPARATUS FOR THE ELECTROLYTIC REFINING OF METALS.—Alfred Schwarz, New York, N. Y., assignor to the General Metals Refining Company, New York, N. Y. The combination of a cathode of large surface for a given tank capacity consisting of a plurality of substantially parallel plates, and a soluble anode, the said cathode-plates being spaced apart and arranged at an angle to the face of the anode so that there will be a free circulation of the solution whereby the metal will be deposited on both sides of the cathode-plates.

760,051. PROCESS OF PREPARING COMPOSITIONS FOR AND OF HEATING AND LAYING BITUMINOUS PAVEMENTS.—Joseph H. Amies, Germantown, Pa., assignor to the Amies Asphalt Company, Philadelphia, Pa. A process of producing a composition for pavements, which consists in wetting cold, sharp, fine sand, or other mineral matters with crude petroleum-oil, then adding thereto, and mixing therewith, a due quantity of granulated or powdered asphalt.

760,057. PROCESS OF ELECTRICALLY SMELTING MATERIALS.—Alfred H. Cowles, Cleveland, Ohio. A process of smelting reducible materials which are normally poor conductors of electricity, but whose conductivity increases with their temperature, which consists in supporting a solid charge of the material and a reducing agent in an electric furnace having a casing of electrically-conductive material, electrically heating the solid charge to the required temperature, and cooling those portions of the charge adjacent to the inner face of the furnace-casing to an extent sufficient to prevent any substantial shunting of the electric current through the casing.

760,172. SLAG FURNACE.—Ralph Baggaley, Pittsburg, Pa., and Oliver S. Garretson, Buffalo, N. Y., assignors to Garretson Furnace Company, Pittsburg, Pa. The combination of a steam-boiler, or the like, having an upright heating-passage, a receptacle for molten slag arranged below said heating-passage, an endless traveling slag-carrier suspended in the form of a loop which dips with its lower portion into the slag-receptacle, elevating

slag therefrom and passing with its ascending portion, coated with molten slag, through said heating-



passage for imparting heat to said boiler, and mechanism acting upon the carrier after it has passed through said heating-passage for detaching the congealed slag from the carrier.

760,174. PULVERIZING-MILL.—Morris Benjamin, Atlanta, Ga. The combination in a grinding-mill of a pan, an annular die, a grinding-roll co-operating with said die, and an arm rotatable in advance of said roll and having an advancing face concave in a substantially vertical direction and adapted to pick up and propel the material centrifugally against the die in the path of advance of the roll.

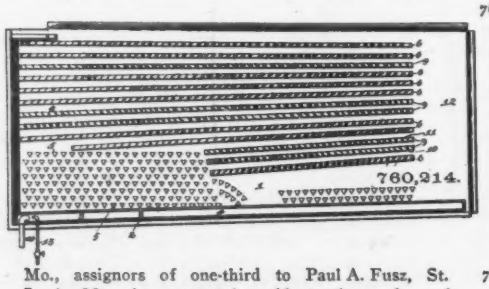
760,183. PROCESS OF MANUFACTURING ARTIFICIAL STONE.—Lawson Chase, Philadelphia, Pa. A process or method of producing an artificial stone consisting in heating the filler and the binder and hardener separately and then feeding and mixing them simultaneously.

760,189. PLANT FOR FEEDING METALLURGICAL FURNACES.—Ambrose P. Gaines, Bessemer, and Edwin R. Cox, Jr., Birmingham, Ala. In a plant for feeding materials to furnaces, the combination with a furnace, of a vertical hoist, a bridge connecting the furnace with said hoist, a cage operating in said hoist, a car carried by said cage and adapted to traverse the bridge to the furnace for discharging materials therein when the cage is at its upper landing, one or more bins provided with chutes arranged to deliver material into the car while held stationary on the cage at said landing, and means for weighing the loaded car at said lower landing before hoisting.

760,196. PIT-CAR.—Patrick Hamill, Darragh, Pa. The combination with a pit-car having a swinging door with an opening in its lower edge, of an eye-bolt fixed in the bottom of the car in alinement with said opening, a pivoted latch having a weighted handle, and a finger adapted when the latch is closed to bridge the said opening and pass through the eyebolt.

760,213. COMBINED CONCENTRATING AND AMALGAMATING TABLE.—John Klein, Desloge, Mo., assignor of two-thirds to Paul A. Fusz and Charles D. McLure, St. Louis, Mo. A combined concentrating and amalgamating table, consisting of a framework, a flooring on the same, a covering for said flooring, an amalgamated wire-gauze located on said covering, a series of ungraduated channels located on said gauze, check-blocks located on the same, means for suspending said table, means for giving said table any degree of inclination, and means for imparting motion to said table.

760,214. CONCENTRATING-TABLE.—John Klein, Desloge, Mo., and Charles D. McLure, St. Louis,



Mo., assignors of one-third to Paul A. Fusz, St. Louis, Mo. A concentrating-table to the surface of which is secured a series of relatively narrow directing-strips spaced apart, each being formed with a series of ridges and grooves that are substantially parallel with the surface of the table and arranged to direct and control the movement of the material supported upon the surface of the table.

760,263. REGENERATIVE GAS-FURNACE.—Frederick Siemens, Dresden, Germany. In a regenerative gas-furnace, means for increasing the temperature of the producer-gas, said means consisting of a gas-flue and an air-flue for conducting highly-heated air, the wall of one flue forming the dividing-walls between the flues, said flues communicating with each other at intervals throughout their length by ports in the dividing-wall through which a portion of the contents of one flue may issue into the other flue and combining with a portion of the contents thereof produce flames by which the said contents are heated.

760,286. HOISTING AND CONVEYING APPARATUS.—Frank N. Wedge, Cleveland, Ohio, assignor to Carrie N. Wedge, Cleveland, Ohio. A traveling carrier comprising separate movable members having suspensory means for the load connecting said members, means to operate said members independently of each other to raise or lower the load, and positive locking means to hold said members apart at varying distances as the load is raised.

760,289. ELECTRICAL APPARATUS FOR WORKING RECIPROCATING TOOLS.—Alfred D. Williamson and Cecil L. Sumpter, Sheffield, England, assignors to Vickers Sons & Maxim, Ltd., Sheffield, England. Apparatus for electrically working reciprocating tools, comprising a reversible electric motor, a reversing-switch and a starting-switch operated from the reciprocating mechanism, and circuits connecting the motor and switches.

760,304. HEATER FOR OIL-WELLS.—Joseph C. Butler, Cincinnati, Ohio, assignor of one-half to Frank S. Gilbert, Lima, Ohio. An apparatus comprising a water-receptacle in the form of a closed cylindrical drum adapted for location at the bottom of an oil-well and having at one side of its central portion a vertical passage extended through it to receive a suction-pipe, a return-pipe connected with the upper part of the drum at the side opposite to said passage, a feed-pipe inclosed in the return-pipe and having its lower and extended down in the drum adjacent to the bottom thereof and means for supplying hot water to said pipes.

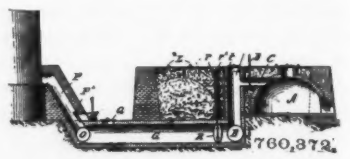
750,309. PUMP-VALVE.—Arthur Choiniere, Holyoke, Mass. In combination, a valve, a stem, having a neck and an adjacent non-cylindrical shouldered portion, a valve-closing spring, and a spring-retainer comprising portions rotatively movable one relatively to the other, having non-cylindrical apertures, arranged for coincidence and for non-registry, and co-operative with the necked and shouldered portions of the valve-stem.

760,312. PROCESS OF MAKING CALCIUM CARBIDE.—Alfred H. Cowles, Cleveland, Ohio. A process of making calcium carbide, which consists in heating a resistance-conductor to incandescence by passing an electric current through it, subjecting carbide-forming materials placed around said conductor to the heat from said conductor and thereby producing a body of superheated molten carbide, and tapping out carbide and supplying fresh materials as required.

760,319. PROCESS OF MAKING COMPOUNDS OF TITANIC AND LACTIC ACIDS.—Carl Dreher, Freiburg, Germany. A process for obtaining a water-soluble and permanent compound composed of titanic and lactic acid in the proportion of one molecule of the former to four molecules of the latter, which consists in dissolving titanic acid in a strong acid, mixing the solution thus produced with a quantity of lactate sufficient to recover by means of the metal of the lactate the acid used for dissolving the titanic acid, then filtering and boiling down the filtrate.

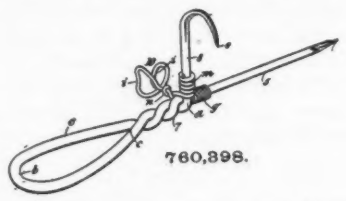
760,324. PUMP.—Alexander D. Elliott, Viola, Ill. In a pump, the combination of a lifting-cylinder, a closed tube within the lifting-cylinder having therein a movable contact member, an electrical communication leading from the lifting-cylinder and connected with the closed tube therein and adapted to be closed and broken by the movement of the movable member within the tube, and means actuated by the rise and fall of liquid within the lifting-cylinder for moving the closed tube to actuate the movable member therein for closing and breaking the electrical connection leading from the lifting-cylinder.

760,372. COKE-OVEN.—Jacob B. Beam, Big Run, Pa., assignor to the Beam Coke Oven Steam Boiler Power Company, Punxsutawney, Pa. The combination of a series of ovens, a main flue running parallel with the ovens below the top level and communicating with the ovens by branch flues, also below the top, valves placed at suitable distances apart



and dividing the main flue into sections, valves in the branch flues controlling the passage of gases from the ovens to the main flue, furnaces placed close to the ovens and connected with the main flue by branch flues and valves in said last-mentioned branch flues for regulating the admission of gases to the furnaces.

760,398. MINER'S CANDLESTICK.—Edson W. Packer, Mace, Idaho, assignor of one-half to Edson W. Packer, Jr., Mace, Idaho. A candlestick formed of wire, and comprising a straight arm pointed at one end, the wire being looped to form a handle at the opposite end, said handle merging into a twist-



ed shank formed of the same wire strand and from which extends a hanger-arm at a right angle thereto and terminating at its free end in a hook, and a clasp formed of a bent wire so as to provide two curved loop members that are projected at one side of the arm and looped handle, said members having their outer looped ends spaced apart, and adapted to receive a candle that is held at the opposite side of the straight arm and away from the hanger-arm and hook thereon.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending April 30, 1904.

6,872 of 1903. MINE CAGE SAFETY GRIP.—J. K. Thomson and A. B. M. Smith, Shotts. Safety appliance for mine cages; consisting of eccentric toothed grippers which grip the mine timbers of the hauling rope breaks.

7,436 of 1903. CONVEYOR.—J. Wainwright, Burstall. A spiral horizontal conveyor for coal and ore, which screens into several different sizes.

10,356 of 1903. MAKING HYDROGEN.—H. G. Hills and H. Lane, Manchester. Apparatus for making pure hydrogen by passing steam over hot iron, and recovering the iron from the oxide formed by means of an excess of water gas, or coal gas.

10,750 of 1903. ROCK-DRILL HOLDER.—R. Nicholson and R. J. Nicholson, Sheffield. An improved drill holder for rock drills.

11,894 of 1903. LIGHTING MINERS' LAMPS.—W. Best, Morley. Improved electrical igniter for miners' safety lamps.

12,186 of 1903. ALLOY FOR GALVANIZING.—P. & A. Guhrs, Berlin. The addition of small quantities of aluminum and bismuth to zinc used for galvanizing, which prevents hardening and oxidation of the zinc.

12,390 of 1903. MINE CAR COUPLING.—W. Rutherford and T. Thompson, Gateshead. Improved grip forks for hauling ore wagons by means of chains.

14,831 of 1903. GRAPHITE SEPARATION.—R. Glogner, Freiburg, Silesia, Germany. Improvements in the method of separating graphite from earthy material by mixing it in petroleum and water.

3,790 of 1904. ELECTRIC FURNACE.—C. A. Keller, Paris, France. An electric smelting furnace, consisting of a number of hearths from which the metal runs into a central crucible.

4,973 of 1904. ALUMINUM SOLDER.—L. Trezel, Paris, France. A solder for aluminum consisting of 100 parts of zinc, two of bismuth and one of nickel.

SPECIAL CORRESPONDENCE.

Denver. May 21.

(*From Our Special Correspondent.*)

The Western Federation of Miners has, through the executive board, issued an extended statement, setting forth its views on the issues involved, which will be presented to the convention of that body, to be held in this city next week. It is addressed: "To the people," is naturally very bitter against Governor Peabody, incidentally against President Roosevelt and ends in a recommendation to the convention to call for action on the part of the labor army of America and to try and get a repeal of the Dick military law.

In the southern coal-fields of Las Animas county, the strike and martial law continue. Eighty men have just been deported from Berwind for having refused to register and to have their descriptions written for future reference. The general situation, however, in the camps of the Colorado Fuel & Iron Co. seems to be improving, and it is expected that within 60 days the full number of miners will be at work. There is a well defined rumor that within a few months a reorganization of this company's affairs will take place.

A few days ago, the Colorado Scientific Society held an interesting meeting in this city, where, among other subjects, that of 'New Geology' was discussed with special reference to Dr. Carpenter's paper on the subject. Mr. W. F. Edwards read a paper on 'Vanadium.'

Mr. H. W. Paul, one of our old mining engineers, who was identified with the early history of Leadville and Aspen, died suddenly a few days ago at his residence near this city.

The graduating class of the State School of Mines has started on a trip through the State to examine the metallurgical plants. They were at Pueblo when heard from last.

In my letter last week, I referred to the number of applications for leases on the claims of the Stratton Estate. Only a few have thus far been granted, five blocks having been leased on Longfellow ground. During the past few years some fine ore shipments have been made therefrom.

There seems to be a good deal of interest taken in the question of what is the present status of the test cases before the General Land office, the mining rights since 1899 having been unsettled. Every surveyor general's office in the West has had its men changing the records in accordance with the ruling at that time.

San Francisco. May 18.

(*From Our Special Correspondent.*)

The principal topic of interest among the mining men of this State, just at present, is dredge mining, and whether or not the anti-debris men of the valleys, backed by their association, will make an attempt to restrict this branch of mining and try to kill it, as they have partially done with hydraulic mining. At the River convention, which meets in this city May 23, it was expected that this subject of river dredging would be brought up by the anti-miners. There is little doubt but that this was the program; but the California Miners' Association took the matter up in advance and prepared to combat such a stand by appointing a delegation which should represent the mining industry and see that no 'snap judgment' would be taken against it. Then the dredge miners at the principal seat of the industry—Oroville—organized an association for mutual protection and invited the Committee of the California Miners' Association to visit Oroville, inspect the mines and see the entire situation for themselves. These steps for active defence have rather given a setback to the intentions of the anti-mining men, and they now think it best not to bring before the convention any measures whatever relating to mining, and to ignore the whole subject, confining themselves to the immediate object of the convention, namely, the question of improvement of the navigable rivers, best systems of reclamation of swamp and overflowed lands, etc. With such a program the miners are perfectly satisfied, being content to pursue their work as at present, without precipitating another conflict with the anti-debris men. But they are fully prepared for a vigorous fight if it becomes necessary to defend themselves.

An attempt is to be made this summer to work a portion of the bed of the Trinity river near Douglas City and below the mouth of Reading creek, Trinity county, by cutting a tunnel to carry the river at its ordinary stage, thus leaving about a mile of the old channel dry at certain seasons. The tunnel is to be 800 ft. long and continued into a 300 ft. open cut. It will be 7 ft. high and 11 ft. wide, with sufficient grade to carry the water freely. The projectors are certain of profitable results, once the river bed is dry. However, this is not always a certainty in this kind of work. The biggest river bed operation ever tried in this State,—the Big Bend tunnel, Butte county,—was an absolute failure after over $1,000,000 had been spent on the enterprise. The English company that attempted to drain the river-bed above Oroville, also failed after building a big dam, and a concrete flume to carry the entire Feather river around the part they intended to mine. They put in hydraulic elevators to lift the gravel and spent two or three million dollars on the undertaking, but got little or nothing back. Way down at bedrock they found old cuts, tools, etc., of the miners of 1849 and 1850, who had worked there by the old-fashioned wing-dam method and had pretty well cleaned up all the gold which had been there. The Big Bend people did not have an experience much different. It is not always certain that the early day miners did not get pretty well down to bedrock in the rich places in the rivers, even by their primitive methods, and not all stretches of rivers in gold mining regions are still rich. Investments in river-bed mining are ones which should be a matter of careful investigation beforehand. Very glowing prospectuses on this subject may be easily written and people not used to this class of mining are apt to be misled. River-bed mining is very attractive, as it is always supposed that in the bed of the river lie large deposits of gold from the surrounding country. The recent dredging operations prove, however, that this gold is usually very finely disseminated and is seldom found in large pockets or great masses. All along the Klamath river they mine by this process every year, but the gains are modest generally. They use the old-fashioned current wheel and Chinese pump to get a small part of the river-bed dry enough to work. Most of the richest bars have long since been worked out, however. Of course, there are doubtless many stretches of river-bed yet untouched and rich, and the part of the Trinity referred to may be one of these. At all events the proposed tunnel is not a very long one to give access to so much river-bed.

On Sunday last the French Gulch Miner's Union issued a notice declaring "off" the troubles between it and the Hazel Mining Co., owning the Gladstone mine. This is quite a victory for Manager Jillson, who has been fighting for the "open shop" principle at his mines.

T. H. Speddy has filed an action against the Pacific Steel Co. and its officers, together with the San Diego Imperial Construction Co. He charges that $30,000 was obtained from him by misrepresentations. He asks for an injunction preventing defendants from disposing of the notes endorsed by him. The answer of the defendants has not yet been filed. This is the company which intended establishing large steel works in California, to which reference has been made in one of these letters.

The Basler Mining Co., of Tehama county has the decision of the commissioner of the land office affirming the decision of the register and receiver of the Marysville land office, declaring the land to be more valuable for mining than for agriculture. The case has long been pending.

It appears that after Manager Arthur Goodall refused to take back all the striking miners at the Fremont Consolidated mine, Amador county, desiring to leave some out, the men refused to come back and presented a written statement of the demands of the union, which included an advance of 25c. per day in wages; recognition of the union by the Fremont Consolidated Co., and reinstatement of seven discharged miners. Mr. Goodall was ordered by the directors not to accept the terms offered and in no way to recognize the union. About 100 men are out of work and the mill is idle. Pickets have been placed around the works to prevent non-union men coming to work. It is not at all probable that the Goodalls will yield their point, and as a result the mine may remain idle for some time.

Duluth. May 21.

(*From Our Special Correspondent.*)

The Zenith Furnace Co., operating a 250-ton blast furnace at Duluth, has its improvements so far along that fires were started under its coke ovens a day or two ago. It is expected that by July the furnace will be in readiness for resumption, work on its enlargement and on the retorts having then been completed. The company is now figuring on a contract for bessemer pig that will maintain the furnace in blast for the greater part of the coming 12 months.

Construction of the great ore-crushing plant being installed at Escanaba by the Oliver Iron Mining Co. has been resumed, and will be carried forward to completion. It will be ready for use next fall. This is the largest and most elaborate crushing plant in existence and will handle the hard ores from the Oliver Co.'s Menominee mines and some of its Marquette mines.

The new steamship *Augustus B. Wolvin*, owned by the Acme Steamship Co., of Duluth, took her first cargo on Lake Erie this week. She was chartered for 12,500 tons of coal, for the Northwestern Fuel Co., of Duluth, and will go up the lakes as soon as the deadlock between ship owners and their captains is settled. This cargo is equal to 11,156 gross tons of iron ore, or 412,500 bushels of wheat. The largest cargo of ore ever taken on the lakes was by the *Edenborn*, of the United States Steel fleet, 8,807 gross tons, last fall, from Escanaba to South Chicago. The largest coal cargo ever carried was by the *I. L. Elwood*, of the Steel Corporation, 7,688 net tons from Buffalo to Duluth. So the new boat is breaking all records. This ship is unable to get into more than four or five ports on the lakes, and will probably ply almost exclusively between Duluth or Two Harbors, at the upper end of the lakes, and Conneaut or Erie at the eastern end.

The Wisconsin & Michigan railroad is preparing to enter the ore-carrying trade of the Menominee range in a large way. June 10 it will put on additional service from mines to its ferry docks at Peshtigo. It is constructing tracks into the Aragon and other mines of the United States Steel Corporation, and to others at Norway and vicinity. It is already in a number of mines in that district, and will soon have its main line so far completed that it can build into the Chapin, Pewabic and other large mines of Iron Mountain. It is now in touch with mines at Crystal Falls, and at other points. The plans of this road are so radically different from those of any ore-hauling line in the Northwest that they will be followed with interest. The company designs to extend the radius of the car ferry to main line transit; in other words, it will utilize car ferries for carrying its ore-laden trains from its terminus on upper Lake Michigan to ports of delivery. At present Chicago and Milwaukee are named as the limits of its operations, but if the car ferry is good for the 300 miles from Peshtigo to South Chicago, it should be good for the 750 miles from Peshtigo to Buffalo. In either case the distance is so great as to pass beyond the mere question of ferriage, to that of long-distance transit. The Wisconsin & Michigan loads its ore trains at mines along the Menominee range, as do its competitors, and carries them to deep water on Lake Michigan, as they also do. But there the similarity ends. Other roads have their ore docks and trans-ship to vessels. At the eastern end of the route the vessels discharge into costly docks at a considerable expense. The Wisconsin & Michigan, on the other hand, will not cease its haul till the freight is delivered in furnace yards, but instead of a railway and its tracks to maintain, it has a couple of high-powered ferryboats. Its ore docks are piers for these ferries. At the lower end of the run these ferries will have similar piers; the trains of ore are run ashore, and taken by locomotives to the yards of consumers. This obviates costly terminals, etc., but of course it adds other expenses. The

plan seems a good one, and the company is certainly making its experiment with evidence of a thorough belief in its availabilty.

It is expected that many thousand cars of ore will be handled over the company's new lines this summer, and that it will prove a competitor for the Chicago & Northwestern and the Chicago, Milwaukee & St. Paul, which have held the traffic. Up to two years ago the former was alone in possession of the field, having been so since the Milwaukee's withdrawal many years before; now, however, there are three to divide a traffic which is actually less, this year, than when the whole was in possession of one line.

Monterey. May 18.

(From Our Special Correspondent.)

Attention has been particularly drawn, during the last week, to the work of S. Pearson & Son, under charge of J. B. Body, at Jaltipan, State of Vera Cruz, where a number of wells are being driven for oil, because of their striking gas, which came out with a great rush. The company feels confident of striking oil in some one of their wells almost any day. In Yucatan concessions have been granted to G. F. Urijay, covering some 150,000 acres, which are believed to have immense oil deposits, and will be thoroughly protected by him and his associates.

In Nuevo Leon the Asuncion mine, on Mitre mountain, near Monterey, which was sold about a year ago by Dignowity Bros. to the Mexico Mining & Exploration Co., of which Senator J. P. Jones was the president, has been leased by the company for a period of 30 years to T. S. Morehead, of Washington, D. C., one of the principal stockholders. He will at once put in a wire tram about two miles long, from the mine to the National Railroad, and start to mining. The ore opened up runs well in lead, iron and lime, a fluxing ore much sought after by the Monterey smelters. And here it may be added that it is generally understood that smelters No. 3 (American Smelting & Refining Co.), No. 2 (Madero family) of Monterey, and the Torrean smelter (also largely opened by the Maderos) have within the last 10 days entered into a pool or combine on smelting charges and purchasing prices in the buying of ores. The American Smelting & Refining Co.'s Monterey plant now has nine stacks in continuous operation, and is smelting a little over 1,000 tons in 24 hours. It is also busy in the construction of a new sampling mill, limestone crusher, elevators and other new works for the installation of mechanical feed like that in use at the El Paso plant.

The Monterey Iron & Steel Co. has its furnace again in blast, after a shut-down of almost a year, because during the former run the rolling mill had not sufficient capacity to keep up with the furnace, and a stock of pig was accumulated that has lasted until now, but it is expected henceforth to keep in blast. The Denver mine, of J. P. Flynn, in the Diente district, near Monterey, on which the lease to the Mexican Lead Co., a sub-company of the Mexican Metallurgical Co, of San Luis Potosi, has expired, is to be worked by the owner, under the management of E. M. Flynn. The ore, which it is said can be mined and put on the cars by the aerial tram at $3.50 Mexican per ton, will continue to go to the San Luis Potosi smelter. The San Salvador, of Lic. Emeterio de la Garza, Jr., located on Mitre mountain, is reported to be in bonanza, and the overhead tram is practically completed between the mine and the railroad.

In Sonora the Yaqui River Smelting & Refining Co., of Toledo, blew in the new 250-ton smelting plant during April, under the management of Frank Davis, and is using coal from La Barranca coal fields. The Greene Consolidated Copper Co., produced close to 5,500,000 lb. of copper during April and has declared a 3% dividend, payable May 25. The Lucky Tiger has made a rich strike about 100 ft. in in the No. 2 adit, running 300 oz. in silver and 2 oz. in gold. The 100-ton lixiviation plant, designed by Mr. Ottokar Hoffman, is being rapidly constructed under the direction of Mr. Charles Myers. Mr. A. J. King is opening up an excellent property in his Cinco de Mayo, near the Lucky Tiger.

In Guadalajara, Jalisco, there is talk again of a large smelter, and this time the movement is said to be headed by Dwight Furness, the well-known ore-buyer and mining man of Guanajuato, owner of the Calabaza mine at Etzatlan, near Guadalajara, the only lead producing property in that district. It is understood that he has interested some of the Guggenheim people, and that a small Mexican plant now operating at that point will be bought and enlarged, for practically all the ore from that section now goes to the plant at Aguas Calientes, a long and expensive haul that cuts out a great many ores which are not particularly rich and highly silicious, or are low grade copper ores. In the Mascota district the Santa Lucia, Santa Rita and Refugia mines of Manuel Mungaray are now among the large producers.

I learn from a reliable source that in the settlement between the Paris Rothschilds and Mr. Carlos Eisenmann over the Inguaran copper mines, the latter received a much smaller sum than 1,500,000 francs, which was mentioned in my letter in the March 31 issue of the JOURNAL. The mines did not cease operations during the controversy, as my letter would lead one to believe.

Victoria. May 17.

(From Our Special Correspondent.)

Vancouver Island coal trade conditions this year are good, and there is every promise of a large output, this being due to an improved Alaskan demand and the increase generally of Northern trade and travel.

Excellent progress continues to be made with the work of boring for oil at Steveston. Yesterday the drill had attained a depth of 600 ft., having passed through a bed of shale, while the occurrence of oil at this spot has been definitely proved.

Arrangements have been concluded for the establishment of three additional large steel dredges on the Fraser river near Lillooett. A Chicago syndicate is also preparing to place a dredge on the river, and there is likely to be a regular dredging excitement this summer.

A deal for the sale of the Copper King mine at Kamloops to New York men is in progress.

It is reported that as the Calumet & British Columbia Gold Mines, Ltd., failed to exercise its option on the Eva mine, at Camborne, arrangements are being made with the Imperial Development Syndicate to organize a company to take over the property. The plan, which requires original shareholders desiring to retain their holdings to pay an assessment of 50c. per share, is regarded with disfavor by the minority, representing chiefly local investors.

In the Slocan City division the lessees of the Neepawa mine commenced shipping ore last week. At the Chapleau, which is also being worked under lease, the mill, which has shut down for nearly three years, is now in operation.

In the Erie section, preparations are now in progress for the commencement of work at a number of properties. The Relief stamp mill and concentrator will start next week, and work will be resumed on the Waffer, Good Hope and Copper Farm about the same time.

An official circular has been directed to shareholders of the Spitzee mine, Rossland, stating that ore stoped from the vein recently crosscut yielded $17.50 per ton. Another vein was encountered west of the shaft, the ore assaying $5 in gold and 9% copper. The drift in the 200-ft. level encountered the vein 10 ft. to the north of the shaft. Bodies of low grade concentrate ore have also been opened up. The company is now experimenting with the Elmore process.

A syndicate has acquired a bond from the Bank of Montreal on a group of 12 properties formerly owned by the Boundary Creek Mining & Milling Co., Ltd., near Greenwood.

London. May 14.

(From Our Special Correspondent.)

The South African market has been much strengthened by the announcement that the convention with China, with regard to the importing of coolie labor for the Rand, has been definitely signed. Both the Stock Exchange and the South African mining houses seem very cheerful, now that all the obstacles have been cleared away. There is no doubt that large supplies of labor will be available, seeing that recruiting has obtained the official sanction of the Chinese Government. The opposition in England to the importing of such labor has come chiefly from people who desired to make political capital against the present government. Some of the opposition came also from people who knew the Chinaman at home and in Australia, and objected to the introduction of such folks into South Africa. These two classes of objectors were prompted by diametrically opposite feelings. The first acted on the theoretical objection to anything approaching slavery, while the latter considered that Chinamen are only to be tolerated under very stringent limitations. As the arrangements have now been made, it is no use arguing these points any longer, but rather to inquire how far the Chinaman will answer the requirements of the work he has to undertake on the Rand. For my own part, I am anxious to know whether he will be an efficient workman at great depths underground, and whether he will be able to withstand the deleterious action of the dust. In all probability, the effects on him will accelerate the serious study of the prevention of dust in mines, and the provision of a system of water sprays at the face of the workings and elsewhere. Then, perhaps, he will not be able to withstand the dampness so caused. Altogether it is felt by many people here that the troubles of the South African mining men are by no means entirely removed.

The report of the Oroya Brownhill Co. for 1903 has the same tale to tell as all the West Australian mines managed by Bewick, Moreing & Co. The working costs have been reduced from £3 9s. a ton, when the firm took over the management in December, 1902, to £2 6s. 8d. per ton in March, 1904, and as the new plant is now at work, it is certain that costs will still further be reduced. The gold won during 1903 was valued at £393,000, and the expenses amounted to rather over £100,000, so that there was a realized profit of about £300,000. Out of this a sum of £51,000 was written off development account and £56,000 was allowed for depreciation of plant and machinery. The dividends distributed amounted to £191,250. Much of the ore at this mine continues to be of comparatively high grade, running over 2 oz. per ton, while there are also large bodies of lower grade ore which the engineers propose to mix with the richer ore, so as to make an average of 30 dwt. per ton. There is enough ore blocked out to last for five or six years, and developments continue to open up still further bodies of ore, so that the shareholders have a pleasant prospect before them.

In the columns of this JOURNAL, the gradual extension of the influence of Bewick, Moreing & Co., has been repeatedly mentioned. There can be no doubt that Mr. Hoover and Messrs. Pritchard, Loring and others are doing excellent work in reducing costs and eliminating speculative operations. Of course, a large part of the reduction of costs comes from the fact that, as the firm manages so many mines, it can purchase its supplies at wholesale rates, and in many cases can buy direct from the manufacturers, and so avoid agents' commissions. An equal share of credit for reduction of costs must be given to the system of management whereby experienced men, thoroughly in sympathy with the head management, are obtained, and whereby the salaries of such men are made to increase with the decrease in costs. Altogether the shareholders in these companies are to be congratulated on their position. It comes, therefore, as an unpleasant shock to hear that in many quarters in Australia there is a feeling that this control of the management of the mines will receive opposition from the authorities. Australia is perhaps the most democratic country in the world. The government of the country is certainly more in the hands of the working man, and owing to the difference in the manner of arranging the elections of representatives and ministers, the government follows more closely the views of the electors than in the United States. In Australia the working man is in the ascendant, and now that a socialist government has come into office, it will be more socialistic than ever. The motto among mine hands in Australia has always been "one manager one mine." No doubt, from the point of view of the local workman and the local merchant, the consolidation of the man-

agement of the leading mines appears in the likeness of a trust, merger or ring. In addition, he has the grievance that the extra profits made by this system does not benefit himself or his own country, but the shareholder in England.

Johannesburg. April 25.

(*From Our Special Correspondent.*)

The sudden rise in the stock market has been a surprise. Every one knew a boom would come some day, probably in the distant future, but booms are like cyclones, you never know when they will strike you. No doubt the feeling that Chinese labor is a certainty accounts for the rise. Shares generally go up in this country in anticipation of an event. Some shares have almost doubled in market value during the past three weeks. Take Vogel Deeps, for instance, with a par value of £1 per share. Three weeks ago they sold for 11s. 6d. @12s.; a few days ago they touched 22s. 6d. The latest price list shows considerable fluctuation, from 18s. to 21s. per share. Or take another class of share, an investment share like the Robinson Central Deep. Two or three months ago, when the reef was first struck, these shares stood at 60s. The mine opened up well, and last week the shares sold for 92s. 6d. per share. It is surprising in these boom times how many people buy at top prices. The last two days show that the present rise is uncertain, for there has been a good deal of fluctuation in prices.

The outlook for Johannesburg during July and August is unfortunate, so far as the dust is concerned. Last year was one of the dustiest years on record, which probably accounted for the high death rate from pneumonia. This year's heavy rains washed tons of mud and sand into the valleys, and now there is dust 12 in. deep on some of the roads. The high winds of July and August will blow this dust far and near.

People seem to have gone diamond mad in this country, a result, no doubt, of the success of the Premier mine. The numerous diamond syndicates, some of which are especially gotten up for a gullible public, always appear to have supporters. A most interesting example is that of the Hope Valley Syndicate, which can truly be called a world's wonder, for not only diamonds, but emeralds, rubies, sapphires, carbuncles, topaz, turquoises, ultramarines, jasper and amethysts have already been found. No wonder *South African Mines* calls this "a jeweller's shop in nature." This paper has distinguished itself on this occasion. Like your JOURNAL, it stands for legitimate mining, and delights in exposing such a fiasco as the Hope Valley. The principal commodity of this syndicate is colored glass, made to look like the precious stones already mentioned. An action for £20,000 damages for alleged libel is being instituted against *South African Mines* for its stand on the Hope Valley hoax. The paper referred to has nothing to fear in the case.

Last week a letter was received from a distinguished professor of mining engineering in the United States, asking if there were any openings in this country for some of the 2,000 mining students who will graduate from the mining schools this year. Distinctly no; for the present, at any rate. For any opening on the Rand, four or five men can be found to fill the position. Skilled men, as surveyors, chemists, metallurgists, assayers, etc., are filling positions in offices for the time being, waiting for things to improve, so that they can get into more congenial and remunerative work. There are enough skilled men in the country at present to meet the demand for a long time to come. The American graduate should not look upon this place as a mining paradise, but should try to get an opening somewhere nearer home. I am sure he will do better there.

Milling with 10 stamps out of 50 has commenced in the recently completed mill of the Robinson Central Deep. This mine is being developed at a frantic speed, and 10 stamps are now being fed with ore from development work. This will be a high-grade mine, and the returns from the crushings are no index of what will be done when the mine is in full swing. An enormous amount of waste is, of necessity, broken in the development stage of a mine, and this barren material brings down the value per ton of the ore extracted. It does not pay to run a sorting table for 10 stamps, so no sorting is being done, the rock being run direct to the mill.

Two new labor-saving devices have recently appeared. One of them is a portable tram-line for use in stopes, and the other is a scheme for mechanically dumping and spreading the sand residues from the cyanide works over a comparatively large area. The portable tram-line should prove serviceable. Up to the present it has been rather expensive to put down an incline plane or tram-line in a stope. A road-bed has to be cut away. This is not only slow and expensive, but the large quantity of waste rock broken is very inconvenient.

LANE CARTER.

Perth. April 11.

(*From Our Special Correspondent.*)

Kalgoorlie.—An important discovery has been made on the Kalgurli, near the boundary of the Associated; a big oxidized formation, assaying 15 dwt. gold, for 15 ft. wide, was found in course of excavating foundations for the additions to the milling plant. The lode has since been traced into Associated ground, and is being actively prospected. The opening of the east lode in the Kalgurli at the 200-ft. level is of great interest—payable ore is being stoped out over the immense width of 135 ft.—by far the largest gold-producing body in the district. The position of the main workings, situated as they are in the heart of the ore bodies, between the east and west lodes, has done much to enable this mine to rank as the most cheaply worked on the field.

The Golden Horseshoe continues to send its richest ore to the Fremantle smelters, but it is understood that, with the completion of the mill to 150 head of stamps, steps will be taken to treat it all at the mine. The Boulder Perseverance return for March was 14,440 oz. fine gold and 1,693 oz. fine silver, valued at £61,509. It is generally expected that this mine will shortly come under the control of Messrs. Bewick, Moreing & Co., who have been making a special examination for the directors. [This change has since been made.—EDITOR.]

The Associated Northern is still hanging fire, but recent development has proved the ore-body exposed to be more valuable than was estimated. When the London management finally settles its difficulties, it is to be hoped that the mine will receive attention.

Coolgardie.—The ore at the 800-ft. level in Bayley's mine continues to open up well, and other developments are good.

Norseman is looking particularly well and lively. Zeigler's find has brought a number of men to the locality. Two leaseholders obtained marvellously rich ore and a lot of prospecting is going on all over the district.

Mulgabbie.—The recent find of telluride ore is opening up well, and promises to be of great importance. At present the rich stuff is in veins of small size, but it is very high grade.

Murchison.—Things are quiet generally, but at some places steady progress is being made. The Great Fingall Consolidated return for March was 12,882 oz. fine gold; the main shaft is now down 1,050 ft. All parts of the workings are looking well.

Northwest Fields.—Some of the old copper mines are being re-worked. The Six-Mile copper mines near Roeburne are raising good ore for shipment; it contains also fair quantities of gold and silver. The Pilbarra railway survey is progressing and it should not be long before this part of the country goes ahead again.

Sydney. April 4.

(*From Our Special Correspondent.*)

Victoria.—The Birthday Gold Mining Co., Berringa, has been working for the past six months on 6-dwt. ore, extracting 3,855 oz. of gold and paying a dividend. The latest and most noteworthy returns from gold mines are: Great Southern Gold Mines, Rutherglen, 490.5 oz.; Hustler's Reef, No. 1, 469 oz. from 319 tons ore; Ulster United. 629 oz. from 213 tons, and a monthly return from Cassilis of 622 oz. from 488 tons. Bendigo mines report that the March yield was 24,031 oz. gold, a record for that month since 1876; the total gold yield for the last quarter was 60,505 oz., an increase of nearly 15,000 oz. over the same period in 1903.

Tasmania.—Mt. Bischoff has declared the usual monthly dividend of 7s. 6d. per share. The total value of the Tasmanian mineral export for February amounted to £79,500.

Queensland.—The report of the New Chillagoe Railway & Mines, Ltd., has just been issued. From the various properties 44,403 tons of copper ore were treated, yielding 2,126.5 tons of matte and 153,765 oz. silver; and 16,879 tons of lead ore yielded 3,644.3 tons lead and 197,325 oz. silver. The railways returned a profit of £34,229.

The Mt. Lyell smelting returns for the last fortnight of February show 29,666 tons treated. The converters produced 592 tons of blister copper containing: 584 tons copper, 61,682 oz. silver, and 1,480 oz. gold.

New South Wales.—The output of the Broken Hill Proprietary for four weeks has been 463,318 oz. silver, 5,880 tons lead, and 46 tons of antimonial metal.

The Sulphide Corporation reports for the third week of March: milled, 4,000 tons, producing 800 tons concentrates containing lead, 60 per cent.; zinc, 10 per cent., and silver, 29.5 oz. per ton. At Cockle creek 307 tons bullion produced containing gold, 583 oz., and silver 18,235 oz.

South Australia.—During 1903 the Wallaroo & Moonta Co. returned a gross profit of £63.-092; the combined cost of mining, smelting, etc., was £54 9s. 3d. per ton, leaving a profit of £5 16s. 2d. per ton of copper produced. During the last fortnight the smelting works treated 1,948 tons of ore for 242 tons of copper and 143.5 tons of sulphuric acid. The recently issued report on the mining operations of the State for 1904 estimates the total value of the production at £520,000.

Auckland. April 27.

(*From Our Special Correspondent.*)

Dredging.—Frosty weather has aided considerably in lowering the level of the Molyneux river, so that most of the gorge dredges are again in full swing, and good returns are once more the order of the day.

State Coal Mines.—The preliminary development works in connection with the two State coal mines are almost completed. Coal is already being furnished to several sections of the New Zealand railways, and in addition a quantity of coal is being supplied to the order of the British Admiralty for men-of-war in Australian waters.

Hauraki Gold Field.—Just now, very little news concerning the state of mining on this field is coming to hand. With one marked exception, the principal mining districts are barely holding their own. The outlook at Waihi is, however, distinctly encouraging, not only in the great Waihi mine, but also in adjoining properties. Work in the Waihi Grand Junction is proceeding with satisfactory results. The developments at the 500-ft., or No. 2 level, showing a long shoot of valuable ore, together with the results of the diamond drill bore-hole, give assurance that the mine will have a prolonged life,

On the Hauraki gold field the chief returns during the past month were: Waihi, £51,404 ($257,020) from 20,533 tons (equal to $12.02 per ton); Talisman Consolidated, £8,056 ($40,280) from 4,250 tons (equal to $9.10 per ton, working expenses $6.38 per ton); New Zealand Crown, £3,458 ($17,290) from 2,572 tons; Tairua Broken Hills, £1,320 ($6,660) from 600 tons; Komata Reefs, £2,200 ($11,000) from 1,250 tons.

At the Thames the second hole on the Kuranui-Caledonia ground has attained a depth of 840 ft. It is now being enlarged to 3 in. in diameter, and cased. As soon as this work is completed the bore-hole will be continued to a depth of 1,500 ft. The bore-hole on the claim belonging to the Thames Improvement Co. has reached a depth of 600 ft. It is passing through hard rock. Thames people are looking forward to the result of the boring operations with much anxiety, as, unless these are successful, the field seems doomed to extinction.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of the ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL, and making this office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and be of any service to them that they can.

TO ENGINEERS VISITING LONDON.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers nonresident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution, and thus enjoy the advantages of temporary office accommodations in the city of London.

PERSONAL.

Mining and metallurgical engineers are invited to keep the ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

Mr. W. Lawrence Austin is at Denver.

Mr. L. D. Godshall returned to Denver on May 20.

Mr. George J. Bancroft, of Denver, is at Seattle, Washington.

Mr. H. A. Mather, of New York, leaves on May 28 for New Mexico.

Mr. Ross B. Hoffman's address is now 44 Nevada block, San Francisco.

Mr. J. D. Millen is metallurgist to the Mt. Bischoff tin mine, in Tasmania.

Mr. H. H. Taft, of Denver, has been making examinations in Michoacan, Mexico.

Mr. Frank Keith is superintendent of the Tonopah Co.'s mines, at Tonopah, Nevada.

Mr. S. F. Parrish has returned to Rossland, B. C., having recovered from recent illness.

Mr. Woolsey McA. Johnson was in New York last week and proceeded to St. Louis.

Mr. J. P. Boyle has gone to Roosevelt, Idaho, as superintendent of the Lost Packer mine.

Mr. C. D. Brodigan has been appointed manager of the Brakpan mines in the Transvaal.

Mr. Thos. H. Oxnam has returned from London, and is now on his way to Los Angeles.

Mr. E. Lenox Simpson has reached St. Petersburg on his return from Port Arthur.

Mr. J. G. Sawyer is now superintendent of the Seigel Consolidated mines, Aurum, Nevada.

Mr. E. H. Stagg, manager of the Bagdad Mining Co., Arizona, is expected in New York.

Mr. L. L. Lane, of San Francisco, Cal., is at Juneau, Alaska, examining mining properties.

Mr. H. T. Tripp, superintendent of the Sumdum mine, is at Juneau, Alaska, for the summer.

Mr. E. B. Conely has assumed charge of the Butie and Gold Center mines, Olinghouse, Nevada.

Mr. E. H. Stahlknecht is making examinations in Mexico for the Guggenheim Exploration Company.

Mr. S. W. George, of the Coromandel mine, in the Kolar district, India, is visiting England on a holiday.

Mr. A. A. Blow, who is now at Sydney, in Australia, expects to reach New York at the end of June.

Mr. H. T. Peterson is general manager of the Geldenhuis Estate and Gold Mining Co., at Johannesburg.

Mr. William J. Barnett sailed on May 25 by the *Majestic* for London, on his return from Sonora, Mexico.

Mr. R. B. Lamb, of Kalgoorlie, is now with the American Copper Co. at Grand Encampment, Wyoming.

Mr. Frederick C. Gilbert has been appointed assistant superintendent of the Eilers plant at Pueblo, Colorado.

Mr. W. O. Emery has been appointed head of the chemistry department of the New Mexico School of Mines.

Mr. Thomas Buzzo, superintendent of the Alice Mining Co., at Walkerville, Mont., is visiting California.

Mr. R. J. Frecheville left New York by the *Kaiser Wilhelm II* on May 17, on his return to London from Colorado.

Mr. L. F. Whitmore, chief engineer to Fraser & Chalmers, Ltd., of London, arrived recently on his way to St. Louis.

Mr. W. L. Cole succeeds Mr. Lewis T. Wright as general manager of the Mountain Copper Co., at Keswick, California.

Messrs. N. C. Bonnevie and E. A. Lee have associated themselves with Mr. C. A. Hoyt in ore-testing works at Denver.

Mr. H. S. Denny is general manager of the Cinderella Deep and Roodeport United Main Reef mines, at Johannesburg.

Mr. Harold Jeans, of the *Iron & Coal Trades Review*, London, reached New York by the *Compania*, and proceeded to Boston.

Mr. Alexander Tournay, of London, who has been examining properties on the Rio Balsas, has returned home by way of New York.

Mr. Henri Bossuet, formerly with the Boleo Copper Co., of Lower California, is now manager of Dos Estrellas Co., El Oro, Mexico.

Mr. E. W. Sebben has just returned to Denver from a professional trip to the Tomichi mining district, Gunnison county, Colorado.

Comte de Gabriac, of Paris, France, secretary of La Grange Hydraulic Co., is on a visit to the company's property, near Weaverville, California.

Mr. C. Bruchhold has moved to Tahuahueto El Alto and can be reached by addressing in care of Rodriguez Bros., Tepehuanes, Durango, Mexico.

Mr. A. L. Jacobs, manager of the Butler-Liberal mine at Bingham, Utah, has returned to Salt Lake City from a two months' trip to Europe.

Mr. Leonard D. Sivyer, of Spokane and Los Angeles, is now at San Francisco on professional business in connection with mines at Carters, in Tuolumne county, California.

Messrs. Guggenheim, Eilers and Newhouse, of the American Smelting & Refining Co., have returned to New York after spending some time in the West, visiting the plants of the company.

Mr. Irving A. Palmer, formerly assistant superintendent of the Eilers plant, at Pueblo, succeeds Mr. Roeser as assistant superintendent of the Arkansas Valley plant, at Leadville, Colorado.

Mr. M. M. Huffner, of Piper, Bibb county, Ala., has been appointed assistant State mine inspector by the Governor, to date from May 10. He succeeds Mr. J. M. Russell, whose term had expired.

Mr. E. Roeser, formerly assistant superintendent of the Arkansas Valley plant, of the American Smelting & Refining Co., at Leadville, has been promoted to the position of superintendent.

Mr. Albert L. Waters has been reappointed manager of the Keystone Copper Co., of Philadelphia, whose mines are at Tapalpa, State of Jalisco, Mexico, and Mr. Llewellyn Reynold, of Chicago, has been appointed superintendent.

Mr. Walter S. Kelly, of San Francisco, formerly connected with the Heinze properties in Montana, has been appointed general superintendent of the properties of the Tintic Mining & Development and the Yampa Smelting Co. in Utah, with headquarters at Salt Lake City.

Mr. John M. Clarke has been appointed geologist of New York State and director of the State Museum, to succeed Mr. F. J. H. Merrill, who will retire permanently from the department. Mr. Clarke has held the position of State paleontologist for several years, continuing the work of the late James Hall.

OBITUARY.

John S. Dymock, vice-president of the Calumet & Arizona Mining Co., and interested in other Michigan and Arizona mining properties, died May 18, aged 66 years.

SOCIETIES AND TECHNICAL SCHOOLS.

AMERICAN FOUNDRYMEN'S ASSOCIATION.—The convention will be held at Indianapolis, June 7, 8 and 9. Many interesting and valuable papers are scheduled to be presented together with addresses by a number of prominent men.

SOCIETY OF CHEMICAL INDUSTRY, NEW YORK SECTION.—The last meeting of the section was held at the Chemists' Club, on Friday evening, May 20, when the following papers were read: 'Method for the Rapid Estimation of Boric Acid,' by M. F. Schaak; 'Notes on Reduced Iron,' by A. H. Gotthelf; 'The Hazard from Explosives and Combustibles in the City of New York,' by Chas. F. McKenna.

INDUSTRIAL.

The American Well Works, of Aurora, Ill., will exhibit its machinery at the St. Louis Exposition in the Machinery Bldg., block 35, and in Mines & Metallurgy Bldg., block 13.

The Harrisburg Foundry & Machine Co., Harrisburg, Pa., has commenced the erection of two large engines for the United States Government at the Norfolk navy yard, Virginia.

Ground has been broken at South Chicago, Ill., for a gigantic coke oven, to cost $1,000,000. The Semet-Solvay Co., it is reported, is behind the enterprise, which will be pushed to completion as rapidly as possible.

The El Paso, Tex., branch of the Sullivan Machinery Co., has filled an order from the La Blanca Mining Co., of Pachuca, Mex., for a large Sullivan air compressor and a powerful engine.

O'Brian & Rhoades, contracting engineers, Denver, Colo., have been awarded the contract for the construction of a gravity system of water works at Paonia, Colo., costing $35,000. Universal, cast iron and wood pipe will be employed.

The removal of the Walker plant of the American Bridge Co. to Ambridge, Pa., from West Homestead, has been completed. The site of 112 acres has been sold to the Mesta Machine Co., while the buildings were sold to A. & S. Wilson.

The Northern Electrical Manufacturing Co. and the Bullock Electric Manufacturing Co. have machine shop equipments in the Palace of Electricity at the World's Fair, comprising the latest types of standard tools, which will be seen in operation.

The Monterey Coal Co., an affiliation of the Monterey Iron & Steel Co., has been granted a concession to construct two lines of railway, starting from its coal mines, Del Menor, in the State of Coahuila, Mex., and running to the International Railway and the town of Muzquiz. The roads are to be of standard gauge.

The rail mill, the 9-in. mill and the plate mill, all departments of the Cambria Steel Co., at Johnstown, Pa., are closed down, due to lack of business. The men employed in the same company's Conemaugh mine were notified that it would shut down indefinitely May 21. The steel car plant of the company is also idle and will not be started up for some time.

The drillers and hoist engineers engaged on the works of the Canadian Niagara Power Co. and the Ontario Power Co. on the Canadian side at Niagara Falls went out on strike recently, affecting between 300 and 400 men and practically tying up the contract work at the two plants. The contractors refused to concede the increase in wages demanded by the men.

The Hazard Manufacturing Co., of Wilkes-Barre, Pa., announces the establishment of offices and warehouse at 71 and 73 West Adams street, Chicago, for the sale of its wire rope product in western territory. A large stock of wire rope and fixtures, electrical wire and also single and double strand, will be carried. The office is in charge of Robert A. Peet, formerly in charge of the sale of insulated wires and cables for the company.

James W. Lyons, who has been for many years associated with the Allis-Chalmers Co. in the capacity of engine salesman, has been appointed manager of the newly-created Power

Department of the Allis-Chalmers Co., with headquarters in Chicago, to date from May 16, 1904. This department will control the sales of reciprocating steam engines, steam turbines (entire unit, including turbo-generators), condensers, gas engines, pumping engines, blowing engines, hoisting engines and air compressors.

TRADE CATALOGUES.

The Pryor Patent Excavator Tooth Co., of Houghton, Mich., has devoted a 16-page booklet of convenient size to the two part dipper teeth, which this company manufactures. The method of operation is described and illustrated, and the time, labor, power and money-saving capabilities are set forth. A special feature of the tooth is its detachability, which renders its re-sharpening a simple matter.

The Baldwin Locomotive Works, of Philadelphia, Pa., has issued catalogue No. 46, which is a record of recent construction of compressed-air locomotives. It contains a number of illustrations of these locomotives which are in operation throughout the United States, and especially those used in mines. The catalogue also contains tables giving the cost of operating compressed-air haulage, as compared with other forms.

The Keystone Driller Co., Beaver Falls, Pa., recently issued three catalogues, which will prove of interest and value to the prospector for oil, water or mineral. No. 1 gives a complete illustrated description of water well machinery for all depths up to 1,000 ft., traction and stationary. No. 2 contains illustrated descriptions of mineral prospecting and gold-testing machines and appliances, with full instructions for operating, while No. 3 deals with oil well rigs.

GENERAL MINING NEWS.

CALIFORNIA.

AMADOR COUNTY.

Defender.—From this mine, at Defender, good rock is being taken from the south drift on the 200 ft. level, and the mill is running on fine ore.

Jose Gulch.—Work is going ahead satisfactorily at this mine between Middle Bar and Jackson, W. E. Stewart, superintendent, and other mines are to be added to the property.

Madrone.—This mine, five miles from Volcano, worked by C. S. Leslie & Co., has three tunnels run upon it. The last milling of about 50 tons ran $26.60 per ton.

Red Tape.—A. Lofsted is about to unwater this mine at Defender and commence operations.

Whitmore.—On this property at Defender, Glenn & Robinson are keeping a four-stamp mill busy on excellent rock.

BUTTE COUNTY.

Consolidated Blue Gravel Mining Co.—W. S. Gage, representing this company, has secured claims extending about four miles along the old blue lead, including the old Catskill mine near Bangor. The gravel is being prospected at different points.

CALAVERAS COUNTY.

Black Oak.—This mine at Altaville, owned by the Black Oak Mining Co., is about to resume operations, the water having been taken out. F. A. Moore is superintendent.

Blue Jay Point.—This gravel mine, two miles from Mokelumne hill, is being worked by M. Cohen & Co., of San Francisco, with Jos. Alcraz as superintendent. The present face of the tunnel taps what is known as the blue gravel channel, with about 4 ft. of gravel.

INYO COUNTY.

A strike of rich gold ore has been made 15 miles northeast of Furnace creek. This is in southern Inyo in the Funeral range of mountains. The discovery is 2.5 miles from water in a rather forbidding country, but prospectors are flocking in. The ore is all free milling, but the rich ground has been pretty well taken up.

KERN COUNTY.

Angelus.—These placer claims at Fremont's Peak, 18 miles southeast of Randsburg, have been sold to C. A. and G. M. Giffen.

Butte Mining Co.—The April clean-up from this mine at Randsburg, of 85 tons of ore brought $4,900.

NEVADA COUNTY.

East Orleans.—This mine on Gold Flat, Nevada City, has been bonded by G. W. Baldwin to J. C. Campbell, and work will soon be commenced. The Mountaineer Mining Co. is also interested in the bond.

South Yuba Mining Co.—This company in Washington district, is preparing to open the Blue Tent ditch, and will build four miles of flume.

PLACER COUNTY.

Soldan Mining Co.—This company, formerly known as the Rawhide, near Towle, has added a four-drill compressor to its plant, and 20 men are at work under H. W. Morris, manager, and J. T. Patrick, superintendent. There is a 10-stamp mill and 10 more stamps are to be added.

SAN DIEGO COUNTY.

Nobles.—For these mines, at Descanso, two 10-ft. Lane mills are ordered, in addition to the one already at the mine. Six concentrators are also to be put in.

Oro Blanco Mining Co.—The tunnel of this company intended to cut the Kentuck ledge is now in 1,000 ft., and will shortly cut the Cincinnati Belle ledge. Air drills are used.

Warlock Mining Co.—This company, at Julian, is arranging to push work on the Chaparral, Warlock, Hastings and other claims, and it is expected that another 10-stamp mill will be put up. The tunnel being driven is now in 600 ft.

SHASTA COUNTY.

Broda Mining Co.—Extensive development has commenced on the Keystone mine at Old Diggings, lately acquired by this company. The ore will be shipped to the smelters at Keswick, and the bunkers are nearly completed.

SIERRA COUNTY.

Gold Canyon.—This mine, on the Middle Yuba river, has started up again and drifting on the ledge is in progress.

Swansea.—In this mine, at Chipps Flat, good paying gravel has been struck. The mine is now being worked through the old Rainbow tunnel.

TRINITY COUNTY.

Fairview Mining Co.—At this mine, Minersville, Jos. Porter, superintendent, it has been decided to add 10 stamps to the mill. The mine is steadily producing.

Sherwood.—At this mine, in the New river district, E. A. Pierson, superintendent, 8 men are at work and the mill runs day and night.

TUOLUMNE COUNTY.

Altadena.—A new 10-stamp mill will be put on this mine at Yankee hill this summer.

Confidence.—Work will be resumed at once on this mine at Confidence, and the mill is expected to start June 1.

Don Pedro.—The new shaft and old workings have been connected by the 487 ft. tunnel at a depth of 160 ft. The new steam hoisting machinery is working.

Doyle Ranch.—Estey, Shaw and Stanford have made a $10,000 payment on purchase price of this mine northeast of Springfield. A mill for crushing the cement gravel will be put in, and oil used as fuel.

Draper.—At this mine, near Soulsbyville, a 10-drill compressor and electric lights have been put in.

McAlpine.—In this mine, where extensive drifting is in progress, a new hoist is being put in.

Victor.—San Francisco men have bonded this property, and have commenced work.

YUBA CUNTY.

Whitney.—This mine, near Cabbage Patch, is under bond to Marysville men, and is being developed. Milton Ramsey is superintendent.

COLORADO.

GILPIN COUNTY.

(From Our Special Correspondent.)

Cook-Fisk and Gregory, Bobtail Consolidation.—Since completing the sinking of over 500 ft. in the Cook shaft, making it 1,400 ft. deep, the Fisk vein has been opened up in the 1,200, also the Bobtail vein. Milling and smelting ores are being opened up in these lower workings, the 300 and 400-ft. workings also show big ore and in the 300 level lessees are taking out ores which net them over $1,000 per car at the Denver smelters. A 500-ton lot of ore from the Mammoth vein gave net values of $30 per ton for concentrates. The working force will soon be increased and additional stamps started in the mill. O. B. Thompson, of Black Hawk, Colo., is manager, and arrangements are being made to reorganize the company at an early date.

Gower Mines Syndicate, Ltd.—Sinking a 100-ft. lift has commenced at the Running Lode mine, which will make that shaft 1,050 ft. deep when completed. Developments are kept well ahead of production and it is estimated that there are ore reserves opened up for at least three years. The first class ore runs as high as $250 to the ton, the second class going between $75 and $150 to the ton. The property is paying regular dividends. T. Dunstone, Black Hawk, Colo., is superintendent.

Gulch.—W. Mitchell & Sons are opening up good ores in this claim in the Lake district, their last smelting ores running $160 per ton for first-class, while their second class ores go from $40 to $80 per ton. Their milling ores clean up between 2 and 3 oz. gold to the cord. A 60 h. p. hoister and 70 h. p. boiler is to be installed and a 24 by 50 ft. building will be erected. The shaft has reached a depth of 280 feet.

Town Topics Gold Mining Co.—A shipment made this week from the East Notaway 420 east level, gave values of 12.5 oz. gold per ton and a 10-cord lot of milling ore from the same lease yielded over 3 oz. gold to the cord. Sylvanite has been found in the 555 or bottom level and second class ore from that part of the mine brought values of 8.5 oz. gold to the ton. The property has paid over $50,000 in dividends during the past three years. S. A. Josephi, Denver, is manager, and Tom G. Martin, Central City, is superintendent.

LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

Alps Mining Co.—This company was incorporated recently. It owns the Alps No. 1 and No. 2 and the Helvetia on the eastern end of Ball mountain extending into South Evans and Iowa gulches. From the Helvetia lessees have taken out some very good ore. The company intends to push work on the three claims this summer.

Anna.—This claim is in Iowa gulch and the recent rich strike in gold holds good. The lessees are shipping ore that will average 8 oz. per ton. The ore was found in a tunnel 350 ft. from the mouth.

Bon Air.—The recent strike of good ore in this property improves with development. The vein is 18 in. wide and has been opened for 40 ft., and some of the ore runs as high as 1,000 oz. silver to the ton. The same company is working the P. O. S. and shipping a very fair grade of iron.

Ella Beeler.—This mine in Iowa gulch is shipping steadily. The upper and lower tunnels have been connected. The property is owned and worked by Charles J. Moore, of Cripple Creek.

Fryer Hill Mines Co.—The sinking of the Harvard shaft is completed and connections made with the El Paso drift. The last 30 ft. of sinking was done in ore and the El Paso drift, 300 ft., is all in ore. A pump station is being cut at the bottom of the Harvard shaft and the water will be lifted from the El Paso shaft. The Pride of the West shaft, 400 ft.,

will be sunk deeper and connections made with the Harvard shaft.

Ibex.—Bids are now being received for the leasing of the ground at No. 2 shaft. The ground will be let out in squares of 100 ft. each, and the company will lease about 50 acres. At No. 4 shaft at the 1,300-ft. level the company is working on a copper fissure vein and shipping regularly.

Moffat.—This shaft, on the Nil Desperandum, on Rock hill, is shipping daily a good grade of ore. The ore body is dipping under the shaft so the lessees this summer will sink the main shaft deeper to get under the ore.

Resurrection.—Mine and mill have resumed work and from the former 150 tons of crude ore are being shipped daily; from the mill 100 tons of concentrates are being turned out daily. During the shut down several improvements were made on the mill and the product now being turned out is clean and finds a ready market.

Rex.—A new shafthouse is being erected on this property to replace the one recently burned. When this is completed work will be resumed underground.

SAN MIGUEL COUNTY.

(*From Our Special Correspondent.*)

Japan Mines Co.—Development on this company's Japan group, in Savage basin, five miles from Telluride, has been temporarily suspended, to enable, it is reported, the making of underground surveys. The development consisted of driving a level eastward on the Japan vein from the intersection of the cross-cut tunnel. It is reported that development will soon be resumed. The ore is a milling and concentrating product, carry gold, silver and lead. T. Walter Beam, of Denver, is manager of the property, and also one of the principal owners. A site for a milling plant at Pandora, 15 miles above Telluride, has been purchased, and it is understood to be the plan of the company to build a concentrating plant there this season and construct a wire rope tramway connecting it with the mines.

Liberty Bell Gold Mining Co.—For the lack of ore this company's 80-stamp mill, near Telluride, is running only the day shift. Since the strike there has never been a full force of miners employed in the mine, and there has not been sufficient ore coming down to supply the mill full capacity, which is 300 tons in 24 hours. Charles A. Chase, of Telluride, is general superintendent.

Yellow Mountain Mines Co.—This company, which last year purchased the Carribeau-Montezuma group of mines, on Yellow mountain, near Ophir, and has since been developing, has put the Carribeau 10-stamp mill in operation. The plant has a capacity of concentrating 30 tons of ore daily. Recently a streak of ore 18 in. wide was encountered in the raise from the 13th to the 12th level, which runs from $50 to $60 per ton in gold, silver, lead and copper. This grade is shipped in its crude state to the smelters. F. T. Axtell, of Ophir, is resident manager. An enlargement of the milling plant is contemplated.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

Cripple Creek Consolidated.—The Russel & Sharpe shaft on the Colorado Boss claim of this company is being pushed rapidly down. The property has been equipped with machinery, and a shaft-house built. The property adjoins the ground belonging to the Peggy Gold Mining Co., from which some very good ore is being taken out.

Cripple Creek Enterprise Co.—Work has been resumed on this property, and the water is now all out. It is understood that considerable development work will be done on the property. The company has a franchise to mine ore under the streets and alleys of a considerable portion of the city of Cripple Creek. A number of lots are also owned. Mr. Dan Hanley, of Cripple Creek, is in charge of the property.

Florence & Cripple Creek Railroad.—A branch is being put in by this railroad from the El Paso switch, to connect with the Henry Adney, the Old Gold and the C. K. & N. properties on Beacon hill.

Henry Adney.—Sinking is in progress on this property, on Beacon hill, and a station will be cut at 50 ft. below the 400-ft. level. A larger hoist has been put in and a new shafthouse is being built. This property adjoins the Old Gold property, and is in charge of Mike Burk, of Cripple Creek.

Monument.—The shaft-house on this property was burnt to the ground this week and the loss amounts to several thousand dollars. The fire also ignited the cribbing of the Portland dump, but it was soon extinguished. The Monument property is being worked under lease.

R. E. A. & A. Mining & Milling Co.—This company, which has a five years' lease on the Wild Horse mine, is putting up a 100-ton cyanide plant on the property, which will be completed in June.

IDAHO.

KOOTENAI COUNTY.

Panhandle Smelting & Refining Co.—It is reported that this company is about to let contracts for a $150,000 smelter to be erected at Lake Pend d'Oreille at the new town of Penderay, near Sand Point. Water power is said to be available, giving a fall of 400 ft. The company owns the townsite of Penderay, covering 300 acres, and has bought the boats of the Pend d'Oreille Navigation Co., consisting of two steamers, three barges, a pile driver and some floating rocks. The company has also secured the Venezuela group, containing a lime formation valuable for its fluxing capacity, although it is stated to carry about $15 in gold and silver. A contract has been let for a dock 2,200 ft. long, to extend from the smelter to the deep water of the lake. The contract calls for completion by May 20. This dock is to have a tramway extending to the smelter to transport the ore from the boats to the ore bins. The smelter will be run automatically, power being supplied by a large electric motor. The sampler will have a 30 h. p. motor, the crusher a 30 h. p. motor and the tramway a 20 h. p. motor. Bids will be called for within the next month, according to reports, for the erection of the plant. H. M. Williams, of Spokane, and W. E. Nelson, of St. Paul, are the prime movers in the enterprise.

SHOSHONE COUNTY.

Evolution.—Fire destroyed the shafthouse of this mine near Osburn, May 14. Machinery was installed only six weks ago, and the loss is placed at $10,000, with no insurance. Miners working in the shaft had a narrow escape. The company will rebuild at once.

Skookum.—The United States Circuit Court of Appeals at San Francisco, it is reported, has granted the application of the Empire State-Idaho Mining Co. for an appeal from the decision of Judge Beatty in the Skookum suit brought by Kennedy J. Hanley, involving about $400,000. Judge Beatty, in rendering the final judgment, refused to allow the mining company an appeal, but granted the right to the American Bonding Co. The appeal will cause to be reviewed before the United States Circuit Court of Appeals all the acts of the Federal Court in the last hearing, at which the court fixed the amount of judgment. The suit has been before the Supreme Court twice on various issues. It is expected the hearing before the United States Circuit Court of Appeals will be had May 31.

ILLINOIS.

JO DAVIESS COUNTY.

Babel Lead Mining Co.—This company was recently organized with headquarters at Warren, and a capital stock of $50,000. The directors are: Byron W. Hicks, Joseph Hicks, Preston T. Hicks, Albert Morrill and C. F. Taylor. The company has secured 2,000 acres of land, and proposes to develop lead deposits on that property. Prospect shafts on the property have shown lead ore. Lead was mined in this region many years ago. Mr. Byron W. Hicks will be engineer in charge of the work.

WILLIAMSON COUNTY.

Big Muddy Coal & Iron Co.—An explosion occurred in shaft No. 7 of this company at Herrin, near Marion, May 11, killing four and burning 20 others so seriously that a number are expected to succumb. The cause of the explosion is unknown.

LOUISIANA.

ACADIA PARISH.

(*From Our Special Correspondent.*)

Jennings Oil Field.—The Western Oil Co. has a new well. The Morse Oil Co. has 5 wells in and is drilling another. The Texas Co. is drilling. The April shipments were 125,000.

MICHIGAN.

IRON—MARQUETTE RANGE.

Cleveland Cliffs Iron Co.—This company is just completing a large power plant for the operation of its Lake mine at Ishpeming. The boiler plant consists of five 72-in. by 18 ft. horizontal tubular boilers for 150 lb. of steam pressure, equipped with Murphy automatic stokers, and the coal bins are placed overhead, so that the coal runs from the bins direct to the stokers. There is also a Green economizer in the uptake of the boiler. The smokestack is of radial brick, 6 ft. 6 in. internal diameter and 166 ft. 6 in. high from the foundation. The engine room contains a hoist, compressor, tram engine and dynamos, and is commanded by an 8-ton hand crane. The hoist consists of a pair of 20-in. by 32-in. Corliss engines driving two 7-ft. diameter by 4-ft. face drums. The drums have steam operated clutches and brakes and the engine has steam operated spiral reversing gear. This machine was built by the Sullivan Machinery Co., of Chicago. The compressor has a capacity of 4,000 cu. ft. of free air per minute and has 22 and 45-in. cross compound Corliss steam cylinders, exhausting into an attached condenser of the Nordberg type. The air cylinders are 37 and 23 in. in diameter, all with 48-in. stroke, having Corliss inlet and outlet valves. The inter-cooler is of the spray type. The electric tram plant consists of a 75-kw. 4-pole General Electric generator, and has 13 and 22 by 14-in. Ideal tandem compound engine with independent condensers. The cooling water for condensing purposes and jackets on the compressor will be supplied from a cooling tower. The building is not quite completed, but the machinery has been installed and will soon be placed in operation.

MINNESOTA.

IRON—MESABI RANGE.

(*From Our Special Correspondent.*)

Albany.—Work has been resumed at this mine, of Pickands, Mather & Co., and it will be stripped extensively and mined this year. It is a large ore-body near Hibbing; it was explored a number of years ago, and bought for the Lackawanna Steel Co. in 1902.

Champion Iron Co.—This company's lands, south of the Mountain Iron mine, will be explored this summer, a contract to that effect having been made. A royalty of 20c. a ton has been agreed upon, providing any ore is found. The land is a little far south for good prospects.

Mahoning.—Loading ore has begun at this mine, though it will probably be discontinued in a few days. Some ore will be forwarded to dock and stored in anticipation of the operation of ore ships shortly. This mine will make few betterments this year, but may carry forward a small amount of stripping left over from last fall.

Oliver Iron Mining Co.—This company will do little or no work this year in stripping its Morris mine, near Hibbing, or its Stephens near Biwabik, though on the latter something may be done late in the season. It is in shape to make a large product, if desired, but the Morris is not as far along.

Pitt Iron Mining Co.—This company, whose Miller mine has been idle since last fall, has re-opened it, and will begin hoisting ore soon. The production this year will not be above the minimum, probably not that much.

Stevenson.—Shovels begin this week on the northwest side of the Stevenson pit to remove

earth from an extension of the ore-body, from which a considerable part of this year's shipments will be taken.

Yates.—This new mine, belonging to M. A. Hanna & Co., has begun some hoisting in a small way, and will be a shipper as soon as possible. It will make a fair output this year. This mine is a medium grade of ore, of a character somewhat similar to that of Sharon, and was taken by the present owners last year. It has been under development since then, with A. F. Maitland in charge of operations. The same company's Frantz mine is not so far along.

LAKE COUNTY.

(*From Our Special Correspondent.*)

At the annual meeting of the Minnesota Mining & Manufacturing Co., the following were elected officers: H. S. Bryan, president; H. W. Cable, manager; J. D. Budd, assistant manager; W. A. McGonagle, treasurer; John Dwan, secretary. This company has been engaged for a year or more in perfecting its plant for the mining and marketing of corundum, from a point on the north shore of Lake Superior, and has spent a large sum of money. A few car-loads of its product have been shipped to market, and the company has been abundantly satisfied as to the value of its product for abrasive purposes. A second company is now preparing to operate in the same field.

MONTANA.

FERGUS COUNTY.

(*From Our Special Correspondent.*)

Barnes-King.—Systematic exploration work by diamond drill has penetrated the ore body to a depth of 700 ft. at this property at Kendall. The extent of the ore shows no diminution. The diamond drill work is being followed by the working shaft. The cyanide plant is treating 220 tons per 24 hours.

Kendall.—The regular monthly dividend of $25,000 for April has been mailed to the stockholders. The mill is treating something more than 300 tons daily.

LEWIS & CLARKE COUNTY.

(*From Our Special Correspondent.*)

Ox Bow Power Co.—Congress granted this company the right to construct a dam across the Missouri river for power purposes at Ox Bow bend about 25 miles from Helena. It is proposed to run a tunnel through the neck forming what is known as the Ox Bow with the dam just above. Engineers estimate that 20,000 h. p. can be furnished. The pole line from the dam to Butte will be about 70 miles long. Cannol & Martin, of Helena, are promoting the project.

Copper Hill.—This property near Austin 12 miles west of Helena is shipping 30 tons of iron and copper ore daily to East Helena. A side track is being put into the ore bins by the Northern Pacific railroad, which will enable the Redbird Mining Co., which is working the mine, to increase the daily shipments to 100 tons. The vein at the 150-ft. level has 31 ft. of ore which is sent to the reduction works without much sorting, having an average value of $25.

PARK COUNTY.

(*From Our Special Correspondent.*)

Kimberly-Montana.—An attachment was served on this company's property at Jardine to satisfy a claim of of A. J. Campbell for $10,000 attorney's fees. This is only one of a number of similar claims instituted against the company since the controlling interest has been held by H. M. Ryan, of Chicago. The property is equipped with two modern 40-stamp mills, an old 20-stamp mill, two cyanide plants to work over tailings; also an electric transmission line.

SILVER BOW COUNTY.

(*From Our Special Correspondent.*)

Plymouth-Silver King.—The Supreme Court has reversed Judge Clancy's decision, wherein he granted the Plymouth people an injunction against the Silver King working a certain vein said to cross the defendant's side line into plaintiff's ground. As soon as the remittitur from the Supreme Court was filed, the defendant, Silas King, filed an affidavit disqualifying Judge Clancy from hearing any further matters in connection with the suit of plaintiffs, charging him with bias and prejudice to such a degree that neither of the defendants could secure a fair trial in his court. William Scallon is one of the counsel for defendant.

Speculator Mining Co.—A complication of suits at law involving this company and certain individuals connected with the company is before the courts. The suits occur over a certain lease to a given portion of the Speculator mine given Stephen Northey and which was operated during a portion of 1903. The company is suing Northey and W. W. Wishon for $145,000 for ore extracted. Northey, on the other hand, has an action against J. M. Dougherty and the Speculator company for $20,000, claiming to have paid Dougherty and the company that much more than was due on the royalty account. The Speculator mine is owned by the Largy estate and John A. Creighton, of Omaha. It is a close corporation; the property is producing 450 tons of ore daily.

NEVADA.

ELKO COUNTY.

(*From Our Special Correspondent.*)

Dexter.—This mine, owned by a Salt Lake company, has been worked by lessees for several months. Ore assaying $1,000 to the ton was recently shipped. The directors of the company are preparing to work the mine and operate the mill again.

STOREY COUNTY.

Scorpion Mining Co.—At the annual meeting in San Francisco last week the following directors were chosen: H. G. Dodge, H. Zadig, J. B. Toplitz, B. F. Shaw and Wm. B. Bannon. The list shows that the control of the company has recently changed. The company elected H. G. Dodge president, and H. Zadig vice-president.

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NEW MEXICO.

GRANT COUNTY.

Burro Mountain.—The removal of this smelter has commenced, and within 20 days, it is expected, the plant will be ready for operation in Silver City.

Mogollon Gold & Copper Co.—The concentrator of this company has been compelled to reduce its capacity owing to the breaking down of the 100-ton crusher. A new crusher was immediately ordered from Denver, and is on its way to Cooney, where it will be installed at once.

SANTA FE COUNTY.

Cochiti Gold Mining Co.—The machinery and other equipment owned by this company in Madrid, has been sold at a receivers' sale in Albuquerque for $25,000. The property included in the sale is reported to represent an original investment of $280,000.

SIERRA COUNTY.

Gold Mines Co.—This company now owns about 110 acres, near Hillsboro, including the Richmond group. The company also owns a mill site comprising 49 acres on Percher creek. A 50-ton mill is now under contemplation to treat the large amount of ore on the dumps running from $4 to $20 per ton.

OREGON.

BAKER COUNTY.

Buckeye.—M. H. Clark, general manager of this mine, 16 miles northeast of Baker City, sent out supplies and a crew of men recently to resume operations. This property will be further developed and several tests made before a mode of treating the ore is decided upon. It is the intention of the management to make a large shipment of the highest grade ore to the Tacoma smelter. This will be followed up by making a run of 150 tons through the stamp mill at Tellocasset, and the concentrates shipped to the smelter. The Buckeye is said to have a large body of ore carrying copper, gold and silver, and the working shaft is down nearly 200 ft.

Cow Creek Mining Co.—A. D. Cavin, F. W. Eppinger and W. J. Paterson, who own nearly all the placer ground on Cow creek, have merged their holdings and formed this company, and will open the ground in a systematic manner this season. Although the ground was known to be rich, the owners did not work in harmony and little was accomplished. Some of the parties owned practically all the water, but claim holders below them refused to allow their ground to be used as a dumping place. Under present arrangements operations will begin at the mouth of the creek and continue toward the head.

I. X. L.—This mine, in the Greenhorn district, has doubled its mill capacity by adding another battery of stamps. The ore body on the 200-ft. level has been proven for over 300 ft., and drifting on a crosscut vein is now in progress. The ore from this vein assays $35 to the ton.

Maxwell.—Plans are being made, it is reported, to put in a larger plant than the 20-stamp mill destroyed last winter by a snowslide. The bins were full of first-grade ore at the time of the accident, but remained in place. The company acquired the property, which is 18 miles northwest of Baker City, in the Rock creek district, last summer at a cost of $60,000.

Sparta.—F. W. Talmage has organized a company with eastern capitalists at the head, and it is reported that these placers will be worked on a larger scale than ever before. A large amount of equipment and supplies have been forwarded to the property and 40 or 50 men will be employed during the season.

GRANT COUNTY.

Badger.—This Susanville property has for some time been hauling ore to Pendleton for shipment to the smelter and employs a good sized force.

JOSEPHINE COUNTY.

Galice Consolidated Mines Co.—A. B. Cousin confirms the report that his company has purchased outright 100 acres of placer ground, taking in all the Rogue river bars from the mouth of Galice creek down the river for three-quarters of a mile. These bars are said to contain gold value to the amount of $1 to $5 per cu. yd. They have only been worked heretofore with a hand rocker, the dirt being carried to the river and washed. It is stated that the company proposes to extend its Galice creek ditches to this ground and work it with hydraulic elevators, one of which, a Campbell, has been ordered, and will be installed inside of 30 days. From the company's high ditch 2,000 in. of water are available for about nine months in the year, and with 300 ft. of pressure on the elevators from 1,000 to 3,000 yd. of gravel can be moved each day.

Oro Fino.—The complete cyanide plant formerly in use at the Darnell mine, near Kalama, Wash., has been purchased for S. Chase, manager of this mine, on Jump-Off-Joe creek, near Grant's Pass. The plant will be received at Merlin and hauled to the Oro Fino. It is a four-tank standard plant, and is equipped with a Sturtevant rock-crusher and centrifugal rolls. Power will be supplied by steam, the boiler and engines being a part of the equipment from the Darnell mine. The Oro Fino has been under development for over a year and is said to show much ore running from $5 to $10 per ton.

MALHEUR COUNTY.

(*From Our Special Correspondent.*)

Black Eagle.—This mine is 28 miles west of Huntington and is under the management of J. F. Meikle, one of the chief owners. The ore is porphyritic, gold-bearing and very free-milling. The property has a 20-stamp mill which is handling 90 tons of ore daily, the cost of mining and milling being 85c. per ton.

PENNSYLVANIA.

ANTHRACITE COAL.

On account of the large accumulation of steam sizes of anthracite coal, a general suspension of the washeries throughout the Schuylkill region has been ordered. About 3,000 men are thrown out of work.

Lehigh & Wilkes-Barre Coal Co.—This company has completed arrangements to sink a 2,625-ft. coal mine shaft in Hanover township, near Wilkes-Barre, which will open up a virgin coal field. The colliery will give work to about 2,000 men.

Philadelphia & Reading Coal & Iron Co.—The Locust Gap slope of this company near Shamokin is still burning. It has been decided to flood the mine.

BITUMINOUS COAL.

Orient Coke Co.—A contract has been let by this company for the construction of 300 coke ovens near New Salem, Fayette county. C. J. Morse has resigned as secretary and treasurer and is succeeded by Reid Kennedy, of Homestead. The Pittsburg office will be discontinued.

SOUTH DAKOTA.

CUSTER COUNTY.

(From Our Special Correspondent.)

Extreme Gold Mining & Milling Co.—Satisfactory returns have been received from the new mill at the Extreme mine near Custer.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Gilt Edge-Maid.—Perry Ankeny, of Deadwood, is in charge of this mine in Strawberry gulch. G. A. Duncan, of Colorado, is general manager of the company and will erect a new cyanide plant. The company has sold $50,000 worth of bonds. The properties are a consolidation of the Gilt-Edge and Dakota Maid mines, four miles east of Deadwood.

Imperial Mining Co.—This cyanide plant at Deadwood is running full capacity. A night shift was put on this week. One hundred tons of ore are coming every day from the McGovern ground in Bald mountain, recently purchased for $100,000, and 150 tons are shipped from other properties of the company.

Lexington Hill Gold Mining Co.—Test runs are being made by the company to determine improvements of the present process. A new mill is to be built.

Manila Gold Mining Co.—The annual election of this company held recently resulted as follows: C. M. Woodbridge, Lincoln, Neb., president; A. W. Beach, Lincoln, vice-president; T. E. Ireland, Nebraska City, Neb., treasurer; F. H. Woodbridge, Lincoln, secretary. The directors decided to resume work at the mine located near the Uncle Sam on Elk creek.

Minnesota Mines Co.—Frank E. Little, of Minneapolis, manager of this company, has located a shaft on the old Garden City Mining Co.'s ground, recently purchased in the Garden City camp.

Omaha Gold Mining & Milling Co.—This company has been organized in Deadwood to develop 120 acres of ground adjoining the Penobscot mine in the Garden City district. Officers elected are William H. Schmoler, Omaha, president; George Rinderspacher, Hastings, Neb., vice-president; Frank A. Mathis, Omaha, secretary; William H. Ostenberg, Wahoo, Neb., treasurer; Dr. H. H. Rheinbold, Omaha, manager. A shaft will be sunk 115 ft. to quartzite.

Pluma Co.—The local management has received instructions to resume work on the new cyanide plant. New ore has been opened up in the silicious measures.

Queen of the Hills Mining Co.—A rich strike has been made in the shaft of this company in Deadwood gulch. A steam hoisting plant has been installed.

Ruby.—The first run of this 100-ton plant was made this week. The mine is located in the Galena district. There are several veins of free milling ore averaging $10 a ton. James Conzett, of Deadwood, is general manager.

Safe Investment Mining Co.—A new hoisting plant is going up at this company's property on Elk creek. At the annual election the officers elected are C. M. Woodbridge, Lincoln, Neb., president; T. E. Ireland, Nebraska City, Neb., vice-president; S. Tilton, Chicago, treasurer; F. H. Woodbridge, Lincoln, Neb., secretary.

Tinton Tin Mining Co.—This company is treating 60 tons of ore daily at Tinton in the Bear gulch district and 1,500 to 2,000 lb. concentrates are saved daily, averaging 75 to 80% metallic tin. With better roads the company will handle 10 0tons daily.

Victoria Mining Co.—This company in the Ragged Top district has decided to build a 200-ton plant this summer. The main ore shoot is 110 ft. wide and 6 ft. thick, averaging $7 a ton.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

Calumet Mining & Milling Co.—This company has discovered a ledge of refractory ore on the Orphan Boy 1 and 3, carrying gold and silver, averaging $7 to $12 per ton. A three compartment shaft is being sunk.

Fairview.—The fourth tunnel on this property exploring a 30-ft. ledge of free milling ore has reached ore assaying $6 a ton. An aerial tram will be built from the mine to the mill. Jerry Harrington, of Deadwood, is the principal owner. The mill will be started soon.

Gimlet Creek Mining & Milling Co.—This company has been organized to develop a ledge of refractory ore on Gimlet creek, assaying $4 to $12 a ton.

Jenny's Gulch Mining & Milling Co.—This company has decided to sink a shaft on the Minnie W lode.

TEXAS.

JEFFERSON COUNTY.

(From Our Special Correspondent.)

Beaumont Oil Field.—Hamilton & Prince and the National Oil & Pipe Line Co. are drilling wells. The daily output at Spindletop is 8,500 bbl.

Crude sells at 50 to 52c. here and at Sour Lake. Prices are steady.

LIBERTY COUNTY.

(From Our Special Correspondent.)

Dayton Oil Field.—The Sapp well, 3 miles south, has been abandoned at 1,140 ft., and the Whitehead well, 12 miles southeast, has been abandoned at 1,300 ft. Wells are being drilled by J. R. Cheek, Robert Andrews, J. S. Wheelis, W. Bullard, Brenkenstein & Co., and Devers Oil & Development Co.

HARDIN COUNTY.

(From Our Special Correspondent.)

Batsons Oil Field.—The following new wells are in: Marx Gilbrough No. 2; Henry Jones No. 1; Guffy Oil Co.'s, Choate No. 3; Sun Co., Wilson & Broach, Ed. Prather, W. E. Brice, L. A. Bentley. The Parafine Oil Co. has sold to the Guffy Petroleum Co. 400,000 bbls. of oil in store. The production remains about the same.

Sour Lake Oil Field.—The East Texas Oil Co. is drilling a wildcat well 6 miles north of Saratoga. The Giles wildcat has been started 2,500 ft. from the nearest producer. The Southern Pacific Railway has brought in a new 300 bbl. well at Saratoga.

UTAH.

BOX ELDER COUNTY.

(From Our Special Correspondent.)

Century.—Superintendent Roi Hardy reports that the Spur vein, from which the company has been drawing much of its best milling ores of late, from the second level, has been encountered on the third level at a point 200 ft. lower down and 400 ft. north. In this vein on level No. 2 a streak of high grade galena ore was found which averages 64% lead and 22 oz. silver. The mill is dropping a full battery of 16 stamps. The mine is producing an average of $12,000 per month and is paying dividends at the rate of $3,000 per month. Manager P. W. Madsen is authority for the statement that 5 lb. of gold-laden amalgam, worth $350, is cleaned up from off the copper plates every 24 hours. From the Wilfley tables in use in the mill 1,000 lb. of concentrates, of the value of $25, are obtained. In addition to this, concentrates to the amount of from 10 to 15 lb. are secured in the panning room daily.

Iona.—The board of directors has authorized the construction of a 50-ton mill. It will be equipped for amalgamation and concentration. P. W. Madsen, of Salt Lake City, is the manager. Large bodies of milling ore have been opened which will average about $10 to the ton. A 20-ft. vein is now being developed.

JUAB COUNTY.

(From Our Special Correspondent.)

Tintic Ore Shipments.—During the week ending May 19 were as follows: Ajax, 1; R. A. Brown, 1; Bullion-Beck, 8; Carissa, 3; Centennial Eureka, 42; Gemini, 11; Grand Central, 25; Lower Mammoth, 4; Mammoth, 7; South Swansea, 2; Uncle Sam Con., 1; Victor Con., 4; Yankee Con., 3; Uncle Sam Con. (concentrates), 3.

Uncle Sam Consolidated.—Sixty tons of ore a day are passing through this company's mill in the Tintic district. The concentrates average from 40 to 45% lead, 22 oz. silver and from $1.50 to $2 in gold. The mill is saving about 90% of the values.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

Bingham Consolidated.—During the week ending May 21 the shipments of copper bullion from this company's plant aggregated 241,000 lb.

Columbus Consolidated.—The electrical machinery for this company's power plant is being installed. The generator was furnished by the Westinghouse company. The plant will be supplying the mines at Alta with power not later than June 15.

South Columbus.—Work has been suspended temporarily. The company has contracted with the Columbus Consolidated for power. The latter will commence deliveries about June 1, when work will resume.

United States.—At this smelter 246,731 lb. of copper bullion was produced during the week ending May 21.

Utah Consolidated.—During the week ending May 21 this company's smelter produced 302,945 lb. of copper bullion.

TOOELE COUNTY.

(From Our Special Correspondent.)

Sacramento.—This mercur company last week disposed of 51 flasks of quicksilver from which was realized $15,795.

WASHINGTON COUNTY.

(From Our Special Correspondent.)

Utah & Eastern Copper Co.—A 25-ft. vein of copper ore has been opened, a large portion of it assaying 16%. The mine is equipped with a good smelter and is a regular shipper of copper bullion.

WYOMING.

CARBON COUNTY.

Doane-Rambler.—A river of water is reported running in this mine, near Encampment, necessitating a shut-down for a few weeks. A 12-ft. shoot of medium grade copper ore was recently opened, in addition to the several deposits of high grade rock.

North American Copper Co.—The smelter of this company was blown in May 19, after a shutdown of more than half a year. Hereafter the smelter will be kept running at more than half of its full capacity, which is 500 tons a day. The smelter produces 99% pure blister copper. The concentrating plant is doing excellent work and the reconstructed southern Wyoming tramway is delivering ore at the smelter bins at the rate of 250 tons each 24 hours.

SWEETWATER COUNTY.

Belgo-American Drilling Trust.—The property of this corporation in Sweetwater county has been seized to satisfy a claim of the National Exploration, Drilling & Development Co. for $9,521.25. The sheriff now holds the drilling trust's oil wells, buildings and supplies at Salt Wells. This corporation is composed of European capitalists who have exploited development schemes in Wyoming during the past

two years, and proposed to build a railroad from Orin to Lander, touching Douglas and Casper. Gov. Fenimore Chatterton is the president of the chief branch of the trust.

FOREIGN MINING NEWS.

AFRICA.

TRANSVAAL.

The Chamber of Mines reports that the production of gold in the Transvaal was 305,946 oz. fine, showing a decrease of 2,296 oz., as compared with March, but an increase of 78,075 oz., as compared with April, 1903. For the four months ending April 30, the total production was 1,192,514 oz., as compared with 841,128 oz. in the corresponding period last year, showing an increase of 315,386 oz., or 41.8% this year.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—For the week ending May 14 shipments aggregated 14,724 tons, as follows: Granby, 10,440; Mother Lode, 3,104; Emma, 1,015; Oro Denoro, 165; total for the year to date, 299,338 tons.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments.—For the week ending May 14 shipments amounted to 4,895 tons, as follows: Le Roi, 1,504; Centre Star, 1,427; War Eagle, 989; Le Roi No. 2, 440; Le Roi No. 2, milled, 350; Spitzee, 60; I. X. L., milled, 125; total for the year to date, 145,968 tons.

NEW CALEDONIA.

Exports of ores are reported by the *Bulletin du Commerce*, of Noumea, for the two months ending February 29 as follows, in metric tons:

Nickel ore	13,381
Cobalt ore	614
Chrome ore	12,252

One cargo of chrome ore, 2,941 tons, from Nehoné, was shipped to the United States.

MINING STOCKS.

(Full quotations given on pages 869 and 870.)

New York, May 25.

A stronger undertone is developing in the stock market, and although sales are limited by conservatism at this season, prices show fractional advances. Some interest was shown in the annual meeting of the Anaconda Copper Co. in Montana, when it was learned that out of 15,000 shareholders, three—directors of the company—held 776,043 shares, or nearly 65% of the total issue, for the Amalgamated Copper Company. On Monday, Anaconda shares sold off two points to $18.50, while Amalgamated gained a point, at $51.375. Greene Consolidated, of Mexico, was only sparingly dealt in at $15.375@$15.25, and White Knob, of Idaho, at $7@$6.50.

Gold and silver shares were quiet. The usual number of Comstocks were called, headed by Consolidated California & Virginia at $1.70. In the Cripple Creek, Colo., group a better feeling prevailed. Portland advanced to $1.70, and El Paso to 80c. Elkton Consolidated brought 67c. Ontario Silver, of Utah, sold 100 shares at $4—the lowest price in some time.

Boston. May 24.

(*From Our Special Correspondent.*)

The rise in Amalgamated Copper failed to stimulate the local copper share list, except in a few desultory cases. Trading has been light and no attempt has been made to bring the public into the market. The air is full of reports of a settlement of copper affairs in Montana and Lawson is out with literature to this effect. There is also talk of an increase in the next Amalgamated dividend, but nothing definite is known. Copper Range settled to $41, but rallied to $43.50, closing at $42.75. Further liquidation in Shannon has caused the price to react to $6.50. Old Dominion spurted to $13.50, on announcement of the dissolution of the preliminary injunction in the New Jersey court. This gives a chance to try the case on its merits. Montana Coal & Coke attracted attention last week by rising to $5, with subsequent reaction to $4. The rally was due to the announcement that the Amalgamated had made an offer for the property, pending an examination of it, and a large block of the stock has been deposited with this end in view.

A fourth consecutive $10 dividend was announced by the Calumet & Hecla to-day, payable June 24. A $2 advance was effected, bringing the price up to $460. New York appears as a buyer of Utah Consolidated from time to time, but little variation occurs in the price, which has been from $33.25 to $33.75 during the week. Daly-West continues to be absorbed and the price rose $1.50 to $24.50. Mass touched $3. A report from the Lake of a $3 assessment was subsequently denied. Granby, which touched $4.12½ recently, has settled to $3.25 again. It is estimated that an order for 50,000 shares of this stock has been filled. United States Coal & Oil enjoyed a $1 advance, touching $10.25, but one-half of the advance was lost. A small pool of floor traders was responsible for the rise. Three officials of the company have recently made an inspection of the property and report very favorably. The company will commence the shipment of coal by October 1, with $500,000 cash on hand. Bingham Consolidated does not respond in the market to the glowing reports put out by officials. About 40% of the ore treated is custom work. The company has placed $500,000 of its 6% convertible bonds. Parrot is firmer at $25, Osceola at $57, Mohawk at $40.50@$39.87½ and Isle Royale at $6.50@$7. An option is reported being given on the Shawmut Copper mine of the Bingham camp for between $50,000 and $60,000, the amount of its bonds and debts.

Colorado Springs. May 20.

(*From Our Special Correspondent.*)

The market for the shares of the Cripple Creek district at the close of this week is in a peculiar condition. The volume of trading has not materially changed. C. K. & N. has reached 35c., while Portland has been selling at $1.70. The strike in the El Paso has been confirmed by the officers and others, but at the same time the stock has not materially advanced. Yesterday it opened at 80 and closed at 80⅛c. strong. There is very little change in the general market.

The Pelican pays $6 per thousand dividend and with that payment goes out of business.

Indications point to an increased amount of trading during the coming week, as eastern orders are quite large.

Salt Lake City. May 21.

(*From Our Special Correspondent.*)

Among the principal events of the week on the Salt Lake Stock & Mining Exchange was the listing of some stocks, which have not participated in regular calls heretofore. Boston Consolidated and Tonopah have both been accepted by the listing committee. The total amount of money involved in the transactions of the week was $26,857 and the leading traders were Little Chief, May Day and Tetro. The former was quite active toward the close of the week, occasioned by the report of favorable developments. Tetro closed slightly down. There was very litle done in the Park City stocks. A small bunch of Daly-West was transferred at prices ranging from $22.50 up to $22.70, while Silver King sold at $51.50. The dividend of $72,000 for the month of May was bid to shareholders of the Daly-West, while the Century stockholders received $3,000.

San Francisco. May 19.

(*From Our Special Correspondent.*)

There is nothing new in the market for Comstock shares this week, except that Ophir has been a little better. The number of assessments pending has rather discouraged buying, and dealings have been on a small scale. Ophir has been selling around $5.50; Mexican, $1.75 @$1.80; Consolidated California & Virginia, $1.65@$1.70; Best & Belcher, $1.45@$1.50; Silver Hill, 55c.; Sierra Nevada, 45c.; Chollar, 18c.; Potosi, 16c. per share.

On the San Francisco & Tonopah exchange business was rather quiet, and sales moderate, but prices were generally steady. Montana-Tonopah brought $1.60; Tonopah-Belmont, 68c.; Tonopah-Midway, 38c.; Rescue, 7c. per share.

On the California exchanges sales on oil stocks were small and business rather dull. Twenty-eight sold at $7.50; Caribou, $4.35; Reed Crude, $1.50; Oil City, 52c. per share.

Monterey. May 14.

(*From Our Special Correspondent.*)

Exchange on New York has dropped from 220.25 to 219.

The stock market is again rather quiet, and the sales reported were in El Oro district for Victoria, $42; Reforma, $18; Aurora, $9; Mexican Venture, $11.50; Dos Estrella, $16.50, and La Union, $22. The Candelaria, of Pinos, Zacatecas, brought $50; Barreño, San Luis Potosi, $66; La Paz, Matehuala, San Luis Potosi, $182, and in Pachuca, Carmen, $85; Santa Gertrudis, $81; Soledad, $700; Reina y Anexas, $15, and Union, of Oaxaca, $25.

COAL TRADE REVIEW.

New York, May 25.

ANTHRACITE.

The hard coal trade still has more orders than it can fill conveniently, although the rise in the thermometer may alter things soon. As usual, certain dealers, anticipatiog the advance of 10c. per ton on June 1 are urging deliveries during the remaining days of May. Consequently shippers, already burdened with old orders unfilled, will be kept hustling for some time to come, perhaps far into the summer.

A further hearing was given in the anthracite railroad rate cases by the Interstate Commerce Commission this week, and counsel for the plaintiff tried to show by the contracts of the Temple Iron Co. that the existing agreement between the coal mining and carrying companies was in violation of the anti-trust law. The first witness called on May 24 was President Baer, of the Philadelphia & Reading Co. His testimony showed that the stock of the Temple Iron Co. was held in trust by the Guarantee Trust Co., of New York, and that contracts had been made whereby the bonds, principle and interest of the Temple Iron Co. were guaranteed by the following roads: Lehigh Valley, 22.88%; Central of New Jersey, 17.12%; Delaware, Lackawanna & Western, 19.52%; Erie, 5.84%; New York, Susquehanna & Western, 4.68%; Philadelphia & Reading, 29,96%. Mr. Baer explained that these percentages were based on coal shipped in previous years. The Temple Iron Co., he added, sold no coal directly, the coal being taken to tidewater by the railroads that connect with the collieries. With regard to the selling price, Mr. Baer stated that the advance of 50c. per ton applied only to the prepared sizes, the output of which constitutes about 60% of the total. The balance of 40% is made up of steam sizes, which, owing to competition with bituminous, are sold at a reduced rate. In testifying, Mr. Alfred Walker, ex-president of the Lehigh Valley Railroad Co., said that during his time in office the coal companies received from 60 to 65% of the tidewater price. On the forenoon of the second day's session much attention was given to the method of arranging prices, and, after severe cross-examination, witnesses denied emphatically that there was any unanimous agreement to raise or fix prices. It was stated that the cost of production has been higher since the strike by reason of an increase in wages, and that the urgent demand for coal warranted an advance in price in order that "the anthracite companies might share in the prosperity of the country." Further, it was contended that only a portion of the coal mined is marketable at remunerative prices, the balance being small sizes used for steam purposes in competition with bituminous, yielding little or no profit.

The trouble at the head of the lakes is still on, and there is no telling when the labor difficulties will be adjusted amicably. Some relief from the congestion of coal at Buffalo has been offered by the dispatch of a few lumber boats that have signed the union agreement. Another relief has been the forwarding of coal

ordinarily needed in the Lake trade to the New England market, where the demand is urgent.

The situation in western markets is far from satisfactory, and what little coal is received all-rail is quickly taken up by those who at this time last year were supplied by Lake shipments. In Chicago territory prospects are no better than they have been, and there is talk of a serious shortage in the markets supplied from here when cold weather sets in. Fortunately there promises to be a good supply of vessels on the lakes at the disposal of coal shippers when the strike is over. Then the Lake coal trade will have one of the busiest times in its history.

BITUMINOUS.

The soft coal trade at the Atlantic seaboard continues inactive. Consumers are taking less coal than the monthly proportions of their contracts call for, except in specific cases. The producers, therefore, are curtailing operations at the mines, in order to prevent unnecessary accumulations at tidewater. The railroads, on the other hand, are closely scanning all coal arriving at tide, and if there is 24 hours' delay in unloading request the shipper to dispose of his cargo. In a way this summary action on the part of the railroads keeps coal from accumulating, but it is a hardship on people who are doing a regular business, and who are not lax in shipping their coal.

Lower prices and weaker off-shore freights have induced some in the trade to look for foreign business, and more orders of this class are reported.

Trade in the far East is taking on considerable coal without it being much noticed, and consumers in this territory are reported to be pretty well filled up. Trade along the Sound is very quiet, most attention of the yards being given to anthracite. New York harbor business is featureless. Prices remain $2.30@$2.35 and upward, according to quality, except where some small lot is forced on the market at a sacrifice on account of demurrage, or for other reasons.

Transportation from mines to tide is excellent, although the railroads from now on will be forced at some points to shut down the freight movement from mid-day Saturday until 6 o'clock Monday morning. The car supply is sufficient for all purposes, being controlled generally by the dispatch given in unloading cars at tidewater. In the coastwise market vessels are scarce, but plenty for the demand. Rates remain firm. We quote current rates from Philadelphia for large vessels as follows: To Boston, Salem and Portland, 90c.; Providence, New Bedford and the Sound, 70c.; Lynn and Newburyport, $1; Gardiner, $1 and towages; Portsmouth, 90@95c.; Bath, 95c.; Gloucester, $1; Saco, $1.10@$1.15 and towages; Bangor, $1.10.

Birmingham. May 23.

(*From Our Special Correspondent.*)

Labor troubles are being reported by operators. The mines at Blocton have been idle for more than three weeks, on account of the miners being dissatisfied with the superintendent. The company expects to have the mines in operation again this week. Labor troubles have been on at Littleton, in the western part of Jefferson county, for the past week or so. The same report comes from Arcadia, in the western part of Jefferson county on the new North Alabama railroad. Leaders of the United Mine Workers are camped near the properties of the Pratt Coal Co., seeking to organize the miners, some 2,000 in number. The company is opposed to the men joining the union, individual contracts having been made with the operatives. However, the mines continue in operation and the daily production by this company is over 4,000 tons of coal.

Cleveland. May 24.

(*From Our Special Correspondent.*)

The coal situation in this territory has not changed materially. The labor difficulty stopping lake shipments has a tendency to throw an enormous amount of material upon the market for immediate consumption. The strike in the eighth district, however, and the possibility that this difficulty will spread to the sixth, seventh and ninth districts has had a tendency to strengthen the market. The appearance of an up-lake demand at this time would, of course, increase the strength of the steam coal situation materially. The demand from the manufacturing concerns in this territory has not changed materially. The general average is a little below what had been naturally expected. Prices are still about at rock bottom, since the struggle to sell the surplus makes a weak market. Steam coal is generally quoted $1 at the mines, both in Ohio and Pittsburg territory.

The call for coke is fair, but not equal to the supply. The railroads still have a superabundance of cars in this territory and can make almost any delivery that the consumers desire. This has made a weaker situation generally for coke. The prices hold steady. The consumption is a little heavier than it was some time ago.

Pittsburg. May 24.

(*From Our Special Correspondent.*)

Coal.—The delay in the opening of lake navigation has seriously affected the coal trade in this district and not more than one-half of the mines are in operation. While operators talk encouragingly of the situation, it is known that there is keen competition for all business that is offered. Run-of-mine coal is quoted at $1.10 a ton at the mine, but during the week a large concern bid $1.05 for a good order and did not get the contract. This is considered evidence that $1 a ton can be done. The river coal trade is excellent and last week shipments amounting to fully 6,000,000 bush. went to southern markets, which almost clears up all loaded coal in the pools and harbor. The river mines are nearly all in operation.

Connellsville Coke.—The demand for Connellsville coke is lighter and both production and shipments show a falling off. During the past week 151 ovens were cut out of the active list and others may be closed if the demand does not improve. Prices remain unchanged, furnace coke being quoted at $1.45@$1.55 and foundry at $1.90@$2. The production last week was 226,103 tons, a decrease of 1,865 tons. The shipments were 9,610 cars, a decrease of 325 cars. Shipments were distributed as follows: To Pittsburg and river points, 3,455 cars; to points west of Pittsburg, 4,850 cars; to points east of Everson, 1,305 cars.

San Francisco. May 19.

(*From Our Special Correspondent.*)

The coal trade continues quiet, but steady. There is no change in prices.

Pacific coast coals in large lots to dealers are quoted as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle and Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; white ash, $5.25. For Rocky Mountain coals, ex-car, to dealers, prices are $14 for Colorado anthracite, $11.50 for Castle Gate, Clear Creek, Rock Springs and Sunnyside. Eastern coal is nominal at $14 for Pennsylvania anthracite and $13 for Cumberland. Foreign coal in cargo lots is quoted at $13 for Welsh anthracite, $8.50 for cannel and $7.50 for Wallsend and Brymbo.

Foreign Coal Trade. May 25.

The Boston & Maine Railroad has closed a contract with the Dominion Coal Co. for 75,000 tons of Cape Breton coal, at Boston or Portland. The price is $2.58 per ton, delivered.

Foreign advices state that the Dominion Coal Co. will export large quantities of its coal to Sweden during the coming summer, and that several large steamers will be regularly employed carrying it across. The steamer which will make the initial voyage for this year in the new trade is the *Eidsvold*, which will carry a cargo of 5,500 tons, and will be laden for Sweden immediately.

Imports of fuel into Germany for the three months ending March 31 were as follows, in metric tons:

	1903.	1904.	Changes.
Coal	1,279,805	1,229,210	D. 50,595
Brown coal	1,935,775	1,853,876	D. 81,899
Coke	102,483	133,086	I. 30,603
Totals	3,318,063	3,216,172	D. 101,891

The brown coal (lignite) was all from Austria. The chief imports of coal were from Great Britain.

Exports of fuel from Germany for the three months ending March 31 were as follows, in metric tons:

	1903.	1904.	Changes.
Coal	4,385,386	4,423,776	I. 38,390
Brown coal	5,822	5,374	D. 448
Coke	610,815	639,950	I. 29,135
Totals	5,002,023	5,069,100	I. 67,077

The principal exports of coal were to Austria, Holland, Switzerland and Belgium; of coke, to France and Austria. There were 5,535 tons of coke sent to the United States this year.

Exports of fuel from Great Britain for the four months ending April 30 were, in long tons:

	1903.	1904.	Changes.
Coal	13,788,050	14,303,227	I. 515,177
Coke	202,497	217,251	I. 14,754
Briquettes	255,868	419,024	I. 163,156
Total	14,246,415	14,939,502	I. 693,087

In addition to these exports there were sent abroad for the use of steamships engaged in foreign trade, 5,039,348 tons in 1903, and 5,283,697 tons in 1904, an increase of 244,349 tons this year.

The exports to the United States were as follows:

	1903.	1904.	Changes.
Atlantic ports	1,007,190	19,456	D. 987,734
Pacific ports	13,953	34,660	I. 20,707
Total	1,021,143	54,116	D. 967,027

The trade has now dropped back to its normal dimensions.

Messrs. Hull, Blyth & Co., of London and Cardiff, report, under date of May 14, that the coal market remains very quiet. Quotations are: Best Welsh steam coal, $4.20; seconds, $4.08; thirds, $4.02; dry, $3.84; best Monmouthshire, $3.42; seconds, $3.42; best small, $1.90; seconds, $1.80; other sorts, $1.62.

The above prices for Cardiff coal are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthsire descriptions are f. o. b. Newport, both exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½% discount.

The freight market remains quiet and uninteresting. Some rates quoted from Cardiff are: Marseilles, $1.70; Genoa, $1.30; Naples, $1.44; Las Palmas, $1.50; St. Vincent, $1.68; Rio de Janeiro, $2.19; Santos, $2.64; Buenos Aires, $1.86.

IRON TRADE REVIEW.

New York, May 25.

The iron markets continue generally dull and weak. Pig iron is selling in a limited way, only to meet immediate requirements of consumers. Steel billets show no new business, except where shading in prices has been made to induce buying. The fact of this cutting is not seriously denied.

In finished material the story is very much the same. New contracts do not materialize, except on a limited scale, and some heavy buying, which had been anticipated, seems to be postponed for the present. The waiting policy is very strongly in evidence all around.

Sensational reports have been current about a general shutting down of blast furnaces, but doubtless these are very much exaggerated. There is no doubt that during the next month or so quite a number of furnaces will go out of blast, as the situation is getting to be trying for the smaller furnaces, and for those which cannot be cheaply operated for any cause. A general concerted shutting down does not, however, seem probable at present.

The deadlock on the lakes still continues, and no ore shipments have been made so far. Stocks on docks and furnaces, however, are sufficient to prevent any inconvenience for some time.

British Iron Trade.—Exports of iron and steel, and manufactures thereof, from Great Britain, for the four months ending April 30, are valued by the Board of Trade returns as follows:

	1903.	1904.	Changes.
Iron and steel	£10,094,918	£9,046,169	D. £1,043,749
Machinery	6,009,556	6,519,872	I. 510,316
New ships	1,280,896	1,077,283	D. 203,613
Total	£17,385,370	£16,643,324	D. £742,046

Exports of mining machinery, included above, were valued at £285,447, an increase of £57,600 over last year. Nearly half the exports were to South Africa.

The chief items of the iron and steel exports were, in long tons:

	1903.	1904.	Changes.
Pig iron	392,614	273,549	D. 119,065
Bars, rods, etc.	37,498	37,114	D. 384
Sheets and plates	166,835	174,515	I. 7,680
Rails	209,668	141,324	D. 68,344
Tin-plates	96,444	109,584	I. 13,140

Exports of pig iron to the United States, which were 184,471 tons in 1903, fell to 18,470 tons this year. Exports of tin-plates to the United States increased from 18,735 tons in 1903 to 20,956 tons this year.

Imports of iron and steel into Great Britain for the four months ending April 30 were valued at £2,653,273, against £2,676,473 in the corresponding period of 1903, a decrease of £23,200 this year. The chief items of import this year were 43,574 tons of pig iron; 38,248 tons of wrought bars, rods, etc.; 176,275 tons of ingots, blooms and tin-plate bars, and 41,279 tons of structural steel.

Imports of iron ore into Great Britain for the four months were 1,899,935 tons, of which 1,452,297 tons were from Spain; in the four months of 1903 the imports were 2,161,086 tons, of which 1,754,747 tons were from Spain. The total shows a decrease of 261,151 tons this year.

German Iron Trade.—Imports into Germany for the three months ending March 31 are reported as follows, in metric tons:

	1903.	1904.	Changes.
Pig iron	115,579	49,767	D. 65,812
Other iron and steel	785,877	640,402	D. 145,475
Total	901,456	690,169	D. 211,287
	1903.	1904.	Changes.
Pig iron	24,206	33,718	I. 9,512
Other iron and steel	35,479	40,513	I. 5,034
Total	59,685	74,231	I. 14,546

Imports of iron ore were 1,240,662 tons, against 875,403 tons in 1903; an increase of 365,259 tons.

Exports from Germany for the quarter ending March 31 were as follows, in metric tons:

Exports of iron ore were 878,500 tons, against 841,331 tons last year; an increase of 37,369 tons. These exports were chiefly to Belgium and France.

Birmingham. May 23.

(*From Our Special Correspondent.*)

The pig iron market is still quiet. No. 2 foundry, the basis, can be purchased easily at $9.50 per ton, and there is a rumor that this price is being cut. Inquiries made among the manufacturers show that while sales are few right now, quick delivery is being urged, indicating that consumers are buying for immediate needs, and therefore there are grounds for believing that an appreciable improvement is not far distant Mr. J. C. Maben, president of the Sloss-Sheffield Steel & Iron Co., when questioned, said: "The Sloss-Sheffield Co. is receiving some business and I believe others are, too. All of our agents are given the minimum price at $9.75. If others are selling at $9.50 or $9.25 per ton, No. 2 foundry, as reported, we could not expect to get any business."

The following quotations prevail: No. 1 foundry, $10; No. 2 foundry, $9.50@$9.75; No. 3 foundry, $9@$9.50; No. 4 foundry, $9; gray forge, $8.50@$8.75; No. 1 soft, $10; No. 2 soft, $9.50@$9.75.

In finished iron and steel there is very little to report. Only one rolling mill in this district, Gate City, belonging to the Republic Iron & Steel Co., is in operation. The labor troubles still interfere at the Bessemer mills, belonging to the Tennessee Coal, Iron & Railroad Company.

The cast iron pipe trade in this State continues very active. The production is heavy and shipments are steady. Several changes have taken place recently at the Dimmick pipe plant at North Birmingham. General Manager Mesto has severed his connection with the plant. Mr. Jack Bowron is now assisting President Fred Dimmick in the management of the plant. It is understood that all the cast iron pipe plants in the southern territory have much work on hand and more in sight, assuring pretty steady operation through the balance of the year.

Cleveland. May 24.

(*From Our Special Correspondent.*)

Iron Ore.—The situation has not changed. The furnaces do not show any tendency to purchase their supply of ore as yet and the market, as far as sales are concerned, has a backward appearance. The situation is not strong or inviting. The lake situation has not changed. The masters and pilots and the vessel owners are as far apart as ever, and it is beginning to appear as if the situation were getting beyond control. Vessel-owners had hoped for some tie-up which would shorten the season and advance the carrying charges. The result exceeds their expectations. The Civic Federation has offered its services as an intermediary, but no definite steps have been taken. Meanwhile the vessel-owners are making no contracts for the shipment of ore down the lakes and will not do so until they have a better understanding of what is immediately ahead of them.

Pig Iron.—The market is still dead. The consumers of foundry are buying hand to mouth and are seemingly content with what deliveries and prices they are being given by the furnaces. Some consumers are beginning to make inquiries about material for second-half delivery, but they have not come to the point as yet where they are willing to make any purchase on contract. The basic and bessemer trades are still dull, with very little buying. The prices of the second half are still a mystery. First half prices range about $12.50 for No. 2 foundry, Valley furnaces, and $12.25 to $12.75 in the Valley for bessemer and basic.

Finished Material.—The tone of the market has been easier all week, with the possible exception of structural and standard rails, where a little better demand has been noted. The sheet situation is not much changed, unless it be that some of the hope which has pervaded the market has been lost, the producers despairing of keeping the productive capacity busy at the present rate of buying. The market is a little weak, with, however, most producers holding as near as possible to the old rates. The association list hangs close to 2.50c. for No. 27 black sheets out of stock as a basis. The reports of cuts in billet prices have been persistent. The extent of this cutting is hard to find, but reports say that the reductions range from $1 to $3 a ton. The association price is $23.50 Cleveland.

New York. May 25.

Pig Iron.—The local market has been quiet, with demand only for current needs. There are reports of further cutting in southern foundry, but they cannot be verified. For Northern iron No. 1 is still maintained at $15.25@$15.50, but sales are very small. Other prices are as follows: No. 2 X foundry, $14.75@$15; No. 2 plain, $14.25@$14.50; gray forge, $13.75@$14. In Southern iron quotations on dock are: No. 1 foundry, $13.75; No. 2 foundry, $13.25; No. 3 foundry, $13; gray forge, $12.50; No. 1 soft, $13.50; No. 2 soft, $13.

Bar Iron and Steel.—The trade continues quiet. Refined bars are quoted at 1.495c., in large lots, with steel at the same figure. Common iron bars can be had for 1.35c.

Structural Material.—The market remains dull, and only small orders are noted. Large lots at tide-water are still quoted at 1.75@2c. for beams, angles and channels.

Plates.—The market is still dull, with orders confined to small lots. Sheared plates are quoted as follows: Tank, 1.25-in. and heavier, 1.75@1.85c.; flange, 1.85@2c.; marine, 2@2.10c.

Steel Rails.—Nothing is doing in standard rails, but there is some inquiry for girder rails for electric roads. Quotations remains $28 for standard sections, f. o. b. mills. Light rails are quoted f. o. b. eastern Pennsylvania mills, as follows: 12-lb., $27; 20-lb., 25-lb., 30-lb., and 35-lb., $25; 40-lb. and 45-lb., $24.

Philadelphia. May 25.

(*From Our Special Correspondent.*)

Pig Iron.—The statements of our brokers and agents concerning the week's doings in pig iron are far from satisfactory as measured by anticipations a month ago. The expectation then indulged in was that prices had reached their lowest level and that orders for the summer and fall would glide in naturally and that prices would remain stationary. The few sales which have been made by some of our large producers during the past week show that this was a miscalculation. Quite a number, even of the smaller buyers, who were willing to purchase have been scared off and instead of buying car-lots have again begun to buy in a trifling way, looking for something to happen. The impression has spread that there will be and abundant supply of iron of every kind and that eventually the present range of prices will be lowered as much as 50c. Pig iron makers continue to predict a hardening tendency when the legitimate requirements are presented, which they say must show themselves before the close of this quarter. Agents who have been endeavoring to move their customers to action discover that it cannot be done either as to quantity ordered, or as to prices which they will pay. Quotations may be given at $15.50 for No. 1 X—though that money is not always paid. No. 2 X foundry has been bought this week at $14.50; No. 2 plain at $14; No. 2 Alabama is being offered by rail to-day at $14, and northern forge is freely offered at $13.50; basic is firm at $13.75 and several transactions for large lots have been temporarily hung up.

Billets.—Fresh rumors are around that steel billets will be put at $20 flat, and the condition withdrawn, which amounts to a sliding scale. Some buyers are interested in this possibility and certainly they are not purchasing more than they need from time to time until they can see their way a little further on. The average quotations range from $24 to $25 according to quality of steel.

Plates.—This branch of the iron industry is not very well engaged. Most of the business continues to be in small lots, on which prices are well maintained, namely, 1.73½@1.93½ for tank steel from ¼ in. up to No. 10.

Structural Material.—All of the business reported this week consists of small orders. Quotations are 1.73½@1.85 for beams, channels and angles.

Scrap.—Scrap iron is very dull. Railroad scrap sold this week at $15, though there are some dealers who decline to sell under $16; No. 1 steel scrap is held as high as $13; No. 2 forge fire scrap $11.50 and machinery scrap, $12.50 per ton.

Pittsburg. May 24.

(*From Our Special Correspondent.*)

The dullness in the iron and steel market continues, but there has been no material change in prices. This may be due to the fact that there is no demand, or sales, on which new quotations could be based. The pig iron market is featureless outside of a few small sales and the inquiries for foundry and forge iron for the Pennsylvania Railroad tunnel. It is reported here that M. A. Hanna & Co. will get 30,000 tons of this contract and the rest will go to the Valley furnaces. No price is mentioned, but owing to the deliveries, which will run into next year, the rate likely will be better than now prevails. The Lake Superior Co. has not bought any iron in this district and may not do so, although negotiations are still on. It is probable the company will get the iron needed at a nearer point of delivery and it is reported that a contract will be entered into with the Zenith furnace at Duluth. The United States Steel Corporation has blown out one of the furnaces of the Edgar Thomson group and the Neville Island furnace of the Wire Co. and has blown in one furnace in the Youngstown district. It is now in full possession of the property of the Clairton Steel Co., the formal transfer having been made on Saturday. The deal includes three of the most improved blast furnaces in the country, two of which are now in operation. Four merchant furnaces in the Valleys are scheduled to be blown out during the coming week and others may be put out of blast before July 1. Despite this rather discouraging outlook there is no feeling here that there is any danger of a serious depression similar to that of 1893, which continued for several years. Consumers of pig iron appear to be provided with sufficient iron

to meet all requirements for a month or two, and are taking but little interest in the market. Lower quotations on southern iron are made this week; $9.50, Birmingham, is named for foundry No. 2, and it is believed that an offer of $9.25 would be accepted.

The iron and steel mills in the Pittsburg district are running in very good shape and all seem to have a fair supply of orders on the books. Contracts for 12,000 tons of structural material were awarded last week for the Southside warehouse structures. The business was equally divided between the Jones & Laughlin Steel Co. and the Carnegie Steel Co. The Wabash elevated tracks on the Southside will take about 5,000 tons more of structural material. More steel cars are to be bought soon by the Wabash and Pennsylvania railroads, which will still further improve the plate market. The wire mills that a month ago were oversold, and behind in deliveries, have practically caught up, and there is some competition for new business; while it is rather keen, it has not had any effect on prices so far. The merchant pipe trade continues in excellent shape and the mills will be kept busy all summer on orders now on hand. Specifications on steel bars have fallen off somewhat and the mills are not operating full in this branch.

The annual convention of the Amalgamated Association of Iron, Steel & Tin Workers, held at Cleveland, closed on Saturday night after a session lasting 20 days and costing $1,100 a day. Iron, sheet and tin-plate wage scales were prepared to go into effect on July 1, but there is likely to be a number of modifications before they are accepted by the manufacturers. Conferences are now being arranged and the first will be on the iron scale with the Republic Iron & Steel Co. The workers ask for a continuation of the present scale with a number of changes in the foot-notes. No official announcement has been made of the demands for the sheet and tin-plate, but it is understood the workers have agreed to accept a cut of 10% from the scales of 1903-4. These scales were recently reduced 18%, effective until the close of the scale year on June 30. The advisory board was authorized by the convention to declare open any non-union mill, in order to give employment to idle members, but all who accept places are expected to do some organizing work.

Pig Iron.—Prices are a trifle lower this week, bessemer being quoted at $12.50, Valley furnaces, and a sale of 500 tons of foundry No. 2 was made at $13.25, Pittsburg, 10c. below the lowest quotation of the year. Gray forge is down to $12.50@$12.75, Pittsburg, and only a few smalll lots were sold during the week.

Steel.—The demand for bessemer and open-hearth billets is very light, and there is no doubt now of a shading of association prices. It is understood the $23 rate is being cut by independents from 50c. to $1. The steel bar market is quiet and the price remains at 1.35c. Plates are still quoted at 1.60c. and the outlook is good.

Sheets.—The demand continues light and prices remain at a low point. No. 28 gauge black sheets are quoted at 2.20@2.25c. and galvanized at 3.20@3.25c.

Ferro-manganese.—The market is unchanged and domestic 80% is still quoted at $41.50 per ton.

CHEMICALS AND MINERALS.

New York, May 25.

On the whole the market is quiet, and prices show little change.

The Virginia-Carolina Chemical Co. stockholders have voted unanimously to increase the preferred capital by $8,000,000, to $20,000,000, which will carry 8% in dividends annually. Of this new stock $6,000,000 will be issued at once to pay off the loan made to the company in August, 1903, by New York bankers, and the balance will be used to liquidate other debts. No stockholder can subscribe to the new preferred stock at the ratio of more than 15% of his total holdings of both common and preferred, but every shareholder may take at least one new share. Subscriptions must be tendered on or before June 15, 1904, and are payable in three installments.

Cyanide.—In the absence of any large business prices are nominal at 19@20c. per lb.

Bleaching Powder.—Second-hands are practically in control of the spot market, and are making sales in small lots at $1.10@$1.12½ per 100 lb. Importers, however, hold their views at $1.20@$1.25, according to brand. British exports to America show a heavy falling off this year, and in the four months the total was only 21,027,888 lb., as against 32,302,144 lb. in 1903. To some extent this is probably due to the agreement with foreign makers.

Copper Sulphate.—Demand is small, and makers hold prices at $5.05@$5.10 per 100 lb. In April Great Britain exported 12,834 tons, making 43,924 tons for the four months this year, which is 9,311 tons more than 1903, and at better prices.

Acids.—Outside of sulphuric and muriatic acids trade is uninteresting, but prices continue firm, especially in nitric.

We quote as below per 100 lb., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°	$1.50	Oxalic, com'l.	$5.10@$5.50
Muriatic, 20°	1.60	Sulphuric, 50°,	
Muriatic, 22°	1.75	bulk, ton	13.50@14.50
Nitric, 36°	4.50	Sulphuric, 60°,	1.05
Nitric, 38°	4.75	bulk, ton	18.00@20.00
Nitric, 40°	5.00	Sulphuric, 66°,	1.20
Nitric, 42°	5.50	bulk, ton	21.00@23.00

Brimstone.—Small sales by jobbers put the price of best unmixed seconds at $22.75 per ton, while shipments, quoted by importers, are worth $21.75@$22. Best thirds are nominally 50c. less than seconds. According to report the Louisiana product is offered freely in the Central West at $21.25@$21.50.

Pyrites.—Nothing doing to attract attention here, but at southern points buying is better. Prices on contracts are unchanged. In April Great Britain imported 56,284 tons pyrites, making 259,778 tons for the four months, as against 258,947 tons last year. The sulphur content of this year's imports of pyrites is equivalent to 122,096 tons.

We quote domestic pyrites $5 per ton for lump ore, f. o. b. Atlantic coast mines, and 9c. per unit for fines; sulphur content varies from 42@44%. Spanish pyrites, carrying from 46@52% sulphur, are quoted at 11@11.5c. per unit for lump, and 9.5@10c. for fines, delivered at Atlantic ports.

Phosphates.—All eyes are turned to the superphosphate situation on the Continent, and while some exporters of phosphates believe a dissolution of the manufacturers' compact may react on the mining industry, others better informed, think otherwise. Certainly low prices for superphosphates encourage the consumption, and if competition is to become keen again, it behooves manufacturers to economize not only in purchasing the best raw materials, but also in operating their plants. The consumption of superphosphates is enormous, particularly in Germany, France, Belgium and Italy—four countries that purchase the bulk of the world's output of phosphates. It will be interesting to watch the developments in the superphosphate industry abroad, as in America rapid progress is being made in the same direction, hinting at the time when our exports of raw material will be greatly curtailed. Then it will be up to the European superphosphate manufacturers to draw the bulk of their supplies from Africa, which in turn would mean a corresponding reduction in the grade of fertilizer.

Phosphates.	F. o. b.	C. i. f. Gt. Britain or Europe.
*Fla. hard rock, 77@80%	$7.00@$7.25	$10.07@11.63
land pebble, 68@73%	3.75@ 4.00	7.35@ 8.05
†Tenn. 78@80%	4.00@ 4.25	9.88@10.66
78%	3.75@ 4.00	.....
75%	3.25@ 3.50	.....
73@74%	2.95@ 3.20	.....
‡So. Car. land rock	3.00@ 3.25	.....
river rock, 55@60%	2.75@ 3.00	5.75@ 6.56
Algerian 63@70%	....	6.82@ 7.32
58@63%	....	6.05@ 6.50
53@58%	....	4.95@ 5.00
Tunis (Gafsa)	....	5.75@ 6.50
Christmas Isle, 80@85%	....	11.75@12.54
Ocean Isle, 82@88%	....	12.54@12.98
Somme, Fr., 70@75%	....	10.63@11.02
Bordeaux, Fr., 60@65%	....	7.60@ 7.72
55@60%	....	6.44@ 6.55
Liege, Bel., 60@65%	....	7.00@ 7.10

* F. o. b. Florida or Georgia ports. † F. o. b. Mt. Pleasant. ‡On vessel, Ashley River, S. C.

Nitrate of Soda.—There is no relaxation in the consumption in America, and prices are strong at $2.25@$2.30 per 100 lb. for spot and nearby arrivals, and $2.05@$2.15 for futures, according to position. In Europe there has been a recovery in prices, although the deliveries from January 1 to April 30, amounting to about 576,000 tons, are much less than last year. But stocks in Europe on April 30, 1904, were only 4,000 tons larger than a year ago, and compare with 242,500 tons reported on January 1, 1904.

The official figures outlining the statistical position of nitrate of soda in the third combination year ending March 31, 1904, are shown below, together with those covering the first and second years for comparison. Quantities are given in Spanish quintals of 101.4 pounds:

	1902.	1903.	1904.
Production	28,467,088	30,772,613	31,639,379
Exports to Europe	24,287,357	23,092,543	25,278,897
Exports to U. S.	4,070,161	5,951,589	5,700,315
Total exports	28,720,469	29,520,394	31,591,902
Consumption, Europe	25,345,770	26,292,450	24,764,330
Consumption, U. S.	4,061,620	4,985,943	6,548,781
Total consumption	29,770,341	31,754,455	31,926,251
Visible supply, March 31:			
Europe	11,787,680	9,011,100	9,996,460
United States	722,530	1,351,627	699,283
Chile	4,704,344	5,398,368	4,951,000
Total supply, Mar. 31	17,214,554	15,761,095	15,646,743

Notable changes in the third year are an increase of 2,071,508 qtl., or about 7% in exports, and of 866,766 qtl., or 3% in production, as compared with 1902-3. Consumption in 1903-4, although the largest on record, was somewhat impaired by the smaller European demand; but this has been fully made up by America.

Sulphate of Ammonia.—The trouble is to find a large buyer at this season. Gas liquor is quoted at $3.05@$3.075 per 100 lb. for shipment.

Liverpool. May 11.

(*Special Report of Joseph P. Brunner & Co.*)

Exports of bleaching materials and sodas for the month of April, as per Board of Trade returns, were as follows: Bleaching materials to United States, 45,924 cwts; other countries, 26,198; total, 72,122 cwts. Soda ash, 117,394 cwts; bicarb soda, 23,236; caustic soda, 107,051; soda crystals, 11,324; saltcake, 90,946; other sorts, 27,081; total, 377,032 cwts.

Soda ash is in fair request. For tierces, nearest values are about as follows: Leblanc ash, 48%, £5@£5 10s.; 58%, £5 10s.@£6 per ton net cash; ammonia ash, 48%, £4 5s.@£4 10s.; 58%, £4 10s.@£4 15s. Bags, 5s. per ton under price for tierces. Soda crystals are firm at generally £3 7s. 6d. per ton, less 5% for barrels, or 7s. less for bags, with special terms for a few favored markets. Caustic soda is in steady demand at full prices, as follows: 60%, £8 15s.; 70%, £9 15s.; 74%, £10 5s.; 76%, £10 10s. per ton, net cash. Special quotations for shipment to the Continent and a few other export quarters.

Bleaching powder is inactive and prices are nominal at about £4 5s.@£4 10s.; per ton, net cash, for hardwood packages, as to market.

Chlorate of potash prices have advanced to 2⅞@3d. per lb. net cash. It is reported that a working arrangement has been fixed up between the English and foreign manufacturers, which may account for the advance, as it cannot be owing to the demand, this still continuing light.

METAL MARKET.

New York, May 25.

Gold and Silver Exports and Imports,

At all United States Ports in April and Year.

Metal	April		Year.	
	1903.	1904.	1903.	1904.
Gold:				
Exports	$1,705,486	$19,473,657	$4,340,385	$23,861,296
Imports	1,349,621	10,289,889	9,745,656	32,405,409
Excess	I. $355,845	I. $9,183,788	I. $5,405,271	I. $ 8,544,213
Silver:				
Exports	2,691,472	3,707,206	13,800,517	16,371,225
Imports	1,657,574	2,215,438	6,317,908	9,039,839
Excess	E. $1,033,898	E. $1,491,770	E. $7,482,609	E. $7,331,386

These exports and imports cover the totals at all United States ports. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Exports and Imports, New York.

For the week ending May 21 and for years from January 1.

Period.	Gold.		Silver.	
	Exports.	Imports.	Exports.	Imports.
Week	£135,279	$213,832	$584,109	$45,456
1904	60,648,528	£2,019,812	15,174,960	329,262
1903	5,763,129	2,862,973	7,911,420	817,522
1902	16,455,001	1,072,879	11,965,142	477,708

Gold exports for the week were chiefly to Paris; those of silver to London

There has been a temporary lull in the outward movement of gold, and no bars are reported taken for shipment from New York since Saturday last. The engagements on that date were $2,500,000, making a total of $58,250,000 engaged or shipped since April 7 last, when the movement began. Nearly all of this went to France, and of the total, $18,500,000 was directly on account of the Panama Canal purchase.

While shipments of gold from New York have been heavy, the receipts at San Francisco have been large enough to make up a considerable part of the Eastern exports. The imports of gold at San Francisco, from January 1 to May 15, were $31,629,820. Most of this gold came from Japan, and was in Japanese coin. Very little has been received from Australia this year.

The statement of the New York banks—including the 56 banks represented in the Clearing House—for the week ending May 21, gives the following totals, comparisons being made with the corresponding week of 1903:

	1903.	1904.
Loans and discounts	$923,436,100	$1,056,553,500
Deposits	914,611,100	1,100,566,100
Circulation	44,204,000	36,480,400
Specie	166,002,000	210,002,800
Legal tenders	71,873,500	78,143,000
Total reserve	$237,875,500	$288,145,800
Legal requirements	228,652,775	275,141,525
Balance surplus	$9,222,725	$13,004,275

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison is made with the holdings at the corresponding date last year:

	Gold. 1903.	Silver. 1903.	Gold. 1904.	Silver. 1904.
N. Y. Ass'd	$166,002,000	.....	$210,002,800	.....
England	177,936,800	.....	164,862,370	.....
France	499,356,560	$222,962,200	518,275,530	$224,650,590
Germany	170,985,000	60,075,000	172,490,000	60,605,000
Spain	72,540,000	101,250,000	73,555,000	99,180,000
Netherlands	19,698,500	32,694,000	27,360,000	32,633,000
Belgium	15,296,665	7,648,335	15,083,335	7,541,665
Italy	89,595,000	11,317,000	110,340,000	19,265,500
Russia	383,100,000	43,980,000	425,715,000	42,380,000
Austria	230,050,000	65,660,000	235,995,000	64,425,000

The returns of the Associated Banks of New York are of date of May 21, and the others May 19, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

Under the impulse of a special order, the silver market has had a better tone the last few days, and closes to-day, steady, with good buying at 25¾d.

The United States Assay Office in New York reports receipts of 17,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to May 12 are reported by Messrs. Pixley & Abell's circular as follows:

	1903.	1904.	Changes.
India	£2,760,125	£4,395,153	I. £1,635,028
China	168,156	100,781	D. 67,375
Straits	148,391	58,103	D. 90,288
Total	£3,076,672	£4,554,037	I. £1,477,365

Receipts for the week this year were £247,000 in bar silver from New York, and £11,000 from Australia; total, £258,000. Shipments were £253,950 in bar silver to Bombay, £55,000 to Calcutta, and £5,000 to Malta; total, £313,950.

Indian exchange has been strong, as business has been very good in India, and the demand for money rather better than usual. The Council bills offered in London were taken at an average of 16.03d. per rupee. Gold continues to go from Australia to India. There has been considerable buying of silver in London, which is believed to be on account of the Indian currency department.

The movement of gold and silver in Great Britain for the four months ending April 30 is reported as follows:

	1903.	1904.	Changes.
Gold:			
Imports	£8,482,936	£11,506,384	I. £3,023,448
Exports	4,736,265	10,430,478	I. 5,694,213
Excess, imp.	£3,746,671	£1,075,906	D. £2,670,765
Silver:			
Imports	3,132,598	4,534,140	I. 1,401,542
Exports	3,714,901	5,017,772	I. 1,302,871
Excess, exp.	£582,303	£483,632	D. £98,671

Of the silver imported this year a total of £3,280,154, or 72.3 per cent of the whole, is credited to the United States.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	$0.44¾	$0.46½
Peruvian soles and Chinese pesos	.40	.43¼
Victoria sovereigns	4.86	4.87
Twenty francs	3.86	3.88
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

May.	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Copper. Cathodes, Cts. per lb	Copper. London, £ per ton.	Tin, Cts. per lb.	Lead, Cts. per lb.	Spelter. N. Y., Cts. per lb.	Spelter. St. Louis, Cts. per lb.
19	12¾ @13	12⅛ @12¾	12¼ @12⅜	56¾	27⅞	4.45 @4 50	4.90 @4.92½	4.72½ @4.75
20	12¾ @13	12⅛ @12¾	12¼ @12½	56⅝	27⅞	4.45 @4.50	4.90 @4.92½	4.72½ @4.75
21	12¾ @13	12⅛ @12¾	12¼ @12½	....	27¾	4.35 @4.40	4.90 @4.92½	4.72½ @4.75
23	12¾ @13	12⅛ @12¾	12¼ @12½	....	27¾	4.35 @4.40	4.90 @4.92½	4.72½ @4.75
24	12¾ @13	12¼ @12¾	12¼ @12½	56¾	27¾	4.35 @4.40	4.90 @4.92½	4.72½ @4.75
25	12¾ @13	12¼ @12¾	12¼ @12½	56½	27½	4.35 @4 40	4.90 @4.92½	4.72½ @4.75

London quotations are per long ton (2,240 lb.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wire-bars.

SILVER AND STERLING EXCHANGE.

May.	Sterling Exchange.	Silver. New York, Cts.	Silver. London, Pence.	May.	Sterling Exchange.	Silver. New York, Cts.	Silver. London, Pence.
19	4.86¾	55⅛	25 5/16	23	4.86⅝	55⅛	.....
20	4.86½	55⅛	25 5/16	24	4.86⅝	55⅝	25 1/16
21	4.86⅝	55⅛	25 5/16	25	4.8670	55⅞	25⅛

New York quotations are for fine silver per ounce Troy. London prices for sterling silver, .925 fine.

The American Metal Co., Ltd., of New York, has decided to increase its capital stock from $1,500,000 to $2,000,000. The change will take effect July 1.

The Metallurgical Co. of America has been incorporated with a capital of $1,000,000. The company will conduct a general metallurgical and smelting business, and will probably establish works at some point to be determined hereafter. The officers of the company are: President, W. Merton; treasurer, Dr. F. Meyer; secretary, L. Seeger; directors, B. Hochschild, J. Langeloth, J. McGee, W. Merton and F. Meyer. The company's main office will be at No. 52 Broadway, New York.

Copper.—Again we have to report a very quiet market. Consumers over here remain apathetic, while the Whitsunday holidays interfered with business in Europe. Under the circumstances, prices have given way and the closing quotations are reported as 12¾@13c. for Lake; 12½@12¾c. for electrolytic in ingots, cakes and wire bars, 12¼@12½c. in cathodes; 12¼@12⅜c. for casting copper.

It is feared that the strike on the New York, New Haven & Hartford Railroad will interfere seriously with copper shipments to the Naugatuck Valley.

The market for standard copper in London which closed last week at £56 12s. 6d., opened on Tuesday at £56 15s., and the closing quotations on Wednesday are cabled as £56 10s.@£56 11s. 3d. for spot, £56 10s.@£56 11s. 3d. for three months.

Refined and manufactured sorts we quote: English tough, £61@£61 5s.; best selected, £62@£62 5s.; strong sheets, £72@£72 5s.; India sheets, £70@£70 5s.; yellow metal, 6⅜@6½d.

Exports of copper from Baltimore for the week ending May 24 are reported by our special correspondent as 55 tons to Great Britain. Imports were 357 tons from Great Britain.

Imports and exports of copper in Germany for the three months ending March 31 were as follows, in metric tons:

	1903.	1904.	Changes.
Imports	18,528	28,312	I. 9,784
Exports	1,342	785	D. 557
Net imports	17,186	27,527	I. 10,341

Imports of copper ore were 1,706 tons, an increase of 139 tons over last year.

Imports of copper and copper material into Great Britain for the four months ending April 30 were as follows, in long tons, the totals showing the approximate contents in fine copper:

	1903.	1904.	Changes.
Copper ore	29,596	26,745	D. 2,851
Matte & precipitate	25,439	19,926	D. 5,513
Fine copper	21,401	30,402	I. 9,001
Totals, fine copper	37,081	43,040	I. 5,959
Exports	18,900	17,468	D. 1,432
Net imports	18,181	25,572	I. 7,391

Of the imports this year 21 tons of ore, 2,039 tons of matte and 16,853 tons of fine copper were from the United States, against 180 tons ore, 1,697 tons matte and 7,086 tons fine copper last year.

Tin has had a declining tendency throughout the week, the consumptive buying being nothing out of the ordinary. Nothing of special interest has transpired. The closing quotations are given as 27½@27¾ for spot, 27¼@27½ for futures.

The foreign market, which closed last week at £124 15s., opened on Tuesday at £124 10s., and the closing quotations on Wednesday are cabled as £124@£124 2s. 6d. for spot, £123 10s.@£123 12s. 6d. for three months.

Imports of tin into Germany for the three months ending March 31 were 3,321 metric tons, against 3,093 tons last year, an increase of 228 tons.

Imports of tin into Great Britain for the four months ending April 30, with re-exports of imported tin, were as follows, in long tons:

	1903.	1904.	Changes.
Straits	7,122	9,042	I. 1,920
Australia	1,372	1,328	D. 44
Other countries	772	948	I. 176
Total imports	9,266	11,318	I. 2,052
Re-exports	7,706	8,910	I. 1,204
Net imports	1,560	2,408	I. 848

A considerable part of the tin re-exported is metal in transit to this country.

Lead.—The feature of the week has been a reduction in the prices of the American Smelting & Refining Company of $3 a ton. The same took place on Saturday of last week. So far, the decline has not stimulated buying to any appreciable extent. The closing quotations are given as 4.30@4.35 New York, 4.22½@4.27½ St. Louis. The foreign market is easy, Spanish lead being quoted at £11 12s. 6d.@£11 13s. 9d., English lead £11 15s.@£11 16s. 3d.

Imports and exports of lead in Germany for the three months ending March 31 were as follows, in metric tons:

	1903.	1904.	Changes.
Imports	12,605	13,988	I. 1,333
Exports	6,020	5,246	D. 774
Net imports	6,585	8,692	I. 2,107

In the first quarter of this year there were 29,465 tons of lead ore imported, a decrease of 294 tons from last year.

Imports and exports of lead in Great Britain, for the four months ending April 30, are reported as follows, in long tons:

	1903.	1904.	Changes.
United States	12,905	11,564	D. 1,341
Spain	33,504	35,735	I. 2,231
Australia	21,609	23,294	I. 1,685
Other countries	6,944	8,511	I. 1,567
Total imports	74,962	79,104	I. 4,142
Exports	9,583	12,030	I. 2,447
Balance	65,379	67,074	I. 1,695

The lead credited to the United States is chiefly Mexican lead, refined here in bond.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of May 7, that the price of silver during the week has been 13.75 reales per oz. Exchange is 34.94 pesetas to £1. Local quotation has been 69 reales per quintal, which, on current exchange, is equal to £11 1s. per long ton, f. o. b. Cartagena. Exports for the week were 300,000 kg. desilverized to Marseilles, 987,572 kg. pig lead to London and 70,000 kg. to Hamburg.

Spelter continues on its downward course, although there has been fair buying on the part of consumers. The closing quotations are 4.90 @4.92½ New York, 4.72½@4.75 St. Louis. The foreign market is easier, good ordinaries being quoted at £22, specials at £22 5s.

Imports and exports of spelter in Germany for the three months ending March 31 were as follows, in metric tons:

	1903.	1904.	Changes.
Exports	14,497	15,356	I. 859
Imports	4,402	4,301	D. 101
Net exports	10,095	11,055	I. 960

Imports of zinc ore were 16,975 tons, an increase of 2,969 tons over last year.

Imports and exports of spelter in Great Britain for the four months ending April 30 are reported as follows, in long tons:

	1903.	1904.	Changes.
Spelter	28,469	28,939	I. 470
Zinc sheets, etc.	7,461	7,892	I. 431
Total imports	35,930	36,831	I. 901
Exports	2,750	2,427	D. 323
Net imports	33,180	34,404	I. 1,224

Imports of zinc ore are not given in the reports.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of May 7, that prices are a little higher, and some miners are looking for another advance. The output of zinc ore in the district is increasing. Quotations are 68 fr. per ton for blende, 35%, and 47 fr. for calamine, 30% zinc.

Antimony remains dull and neglected. We quote: Cookson's, 7@7½; Hallett's, 6⅞@6⅞; U. S., Italian, Japanese, French, Hungarian and Chinese, 6@6⅛c.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per pound.

Imports of nickel into Germany for the three months ending March 31 were 397,000 kg., against 376,000 kg. in 1903. Exports were 214,000 kg., against 160,000 kg. last year.

Platinum.—Quotations are nominally $18.50 per ounce, but the tendency is upward, and higher prices are expected.

Platinum in manufactured forms is very firm. Messrs. Eimer & Amend, of New York, quote for different forms as follows: Heavy sheet and rod, 75c. per gram; foil and wire, 77c.; crucibles and dishes, 80c.; perforated ware, like cones, etc., 85c. per gram.

Quicksilver.—The New York price is slightly easier at $44.50@$45 per flask, for large lots, with a slightly higher figure quoted for smaller orders. The San Francisco quotations are also somewhat easier, the current price being $43@$43.50 for domestic, and $42.50@$43 for export. The London price is £8 2s. 6d. per flask, with the same figure named by second hands.

Imports of quicksilver into Germany for the months ending March 31 were 172,000 kg., against 147,000 kg. last year.

Imports of quicksilver into Great Britain for the four months ending April 30 were 1,587,730 lb., against 1,607,764 lb. in the corresponding period in 1903. Re-exports of foreign quicksilver were 514,176 lb., against 669,660 lb. last year.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

Aluminum	Per lb		Per lb
No. 1, 99% ingots	33@37c.	Ferro-chromium (74%)	12½c.
No. 2, 90% ingots	31@34c.	Ferro-Tungsten (37%)	38c.
Rolled Sheets	4c. up	Magnesium, pure (N. Y.)	00c.
Alum-bronze	20@23c.	Manganese	$2.75
Nickel-alum	33@39c.	Mangan'e Cop. (20% Mn)	32c.
Bismuth	$2.10	Mangan'e Cop. (30% Mn)	38c.
Chromium, pure (N. Y.)	80c.	Molybdenum (Best)	$2.00
Copper, red oxide	50c.	Phosphorus, foreign	45c.
Ferro-Molybde'm (50%)	$1.25	Phosphorus, American	70c.
Ferro-Titanium (10%)	90c.	Sodium metal	50c
Ferro-Titanium (20@25% N. Y.	55c.	Tungsten (Best)	88c.

Variations in price depend chiefly on size of order.

Missouri Ore Market. May 21.

(From Our Special Correspondent.)

Buying only close to their needs, but with a limited output of zinc ore, the smelters have reduced the visible reserve stock at the end of this week to 3,000 tons, with half of this sold for early delivery. Smelters assert that the situation is critical in view of the fact that they cannot afford to pay a higher price for the ore on the existing spelter market. They assert that they are paying a price for the ore that leaves no margin of profit in smelting, and this probably has given rise to the rumor that a number of furnaces are to be placed on dead fire until the spelter and ore market adjusts itself more to their liking. There is no disposition to force an advance in the price of spelter, but as there is little hope of lowering the price of ore, spelter may respond with advances, if it is known that the production is to be reduced and a certain amount withdrawn from the market. The zinc ore producers claim that they cannot afford to accept lower figures, existing prices leaving insufficient margin for the risk, expense and investment incurred. Feeling in this way, it is evident that a restriction of the output would follow any effort to lower the price. This brings the whole situation up to the consumer of spelter, who, the smeltermen say, have been securing their metal too cheap, considering the price of ore. Every line of industry using zinc in all its forms seems to be prospering and the demand is said to be taking up the production right along. Spelter is now about 50c. per hundred lower than a year ago, when it was considered a very reasonable price, and the ore producers feel that it should be that price now. At any rate there are a number who will quit producing ore unless the present differences are adjusted so as to maintain present prices.

It seems to be up to the consumers of spelter to accord a small advance, rather than have the mines shut down and entail an uncertainty to the market.

The highest price of the past week was $39 per ton, but only two cars brought that price; a few bins sold at $38, and the average price was under $34 per ton.

After ten weeks of uncharged prices in lead the market fell this week. Opening at $58, it dropped to $57.50, to $57 and a few lots sold to-day at $56 per ton.

Shipments of zinc and lead from the district for the week were as follows:

	Zinc, lb.	Lead, lb.	Value.
Joplin	2,552,100	349,890	$55,910
Webb City-Carterville	2,197,520	416,200	48,715
Duenweg	1,152,820	159,220	24,635
Galena-Empire	1,068,750	166,510	20,765
Granby	540,000	36,500	11,500
Prosperity	518,310	84,280	11,170
Aurora	618,360	8,380	9,110
Alba-Neck	505,470	....	8,845
Zincite	290,680	2,520	5,300
Mitchell	138,630	....	4,650
Oronogo	233,660	9,450	4,270
Carthage	185,310	....	2,965
Badger	198,780	....	2,785
Cave Springs	137,660	18,270	2,710
Central City	150,860	14,840	2,535
Beef Branch	48,470	73,970	2,100
Wentworth	108,800	....	1,850
Diamond	63,660	....	1,080
Totals	10,809,840	1,340,030	$220,895
21 weeks this year	216,261,420	26,854,790	4,360,145
21 weeks last year	198,056,020	23,316,380	3,982,773

Zinc value, the week, $183,590; 21 weeks, $3,606,170.
Lead value, the week, $37,305; 21 weeks, $753,975.

Average Prices of Metals per lb., New York.

Mo.	Tin.		Lead.		Spelter.	
	1903	1904.	1903.	1904.	1903.	1904.
Jan.	28.33	28.845	4.075	4.347	4.865	4.863
Feb.	29.43	28.087	4.075	4.375	5.043	4.916
Mar.	30.15	28.317	4.442	4.475	5.349	5.057
April.	29.81	28.132	4.567	4.475	5.550	5.219
May	29.51	.....	4.325	.....	5.639	....
June	28.34	.....	4.210	.....	5.697	....
July	27.68	.....	4.075	.....	5.662	....
Aug.	28.29	.....	4.075	.....	5.725	....
Sept.	26.77	.....	4.243	.....	5.686	....
Oct.	25.92	.....	4.375	.....	5.510	....
Nov.	25.42	.....	4.218	.....	5.238	....
Dec.	27.41	.....	4.162	.....	4.731	....
Year	28.09	.....	4.237	.....	5.400	....

NOTE.—The average price of spelter in St. Louis for the month of January, 1904, was 4.678c. per lb.; February 4.717c.; March, 4.841c.; April, 5.038c.

Average Prices of Copper.

Mo.	New York.				London.	
	Electrolytic.		Lake.		Standard.	
	1903.	1904.	1903.	1904.	1903.	1904.
Jan.	12.159	12.410	12.361	12.553	53.52	57.55
Feb.	12.778	12.663	12.901	12.245	57.34	56.57
Mar.	14.416	12.299	14.572	12 551	63 85	57.321
April.	14.454	12.923	14.642	13.130	61.72	58.247
May	14.435	.....	14.618	.....	61.73	.....
June	13.942	.....	14.212	.....	57.30	.....
July	13.094	.....	13.341	.....	58.64	.....
Aug.	12.962	.....	13.159	.....	58.44	....
Sept.	13.205	.....	13.345	.....	56.82	.....
Oct.	12.801	.....	12.954	.....	55 60	.....
Nov.	12.617	.....	12.813	.....	56.30	.....
Dec.	11.952	.....	12,084	.....	56.36	.....
Year	13.235	.....	13.417	.....	57.97	.....

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Mo.	1902.		1903.		1904.	
	London. Pence.	N. Y., Cents.	London Pence.	N. Y., Cents.	London, Pence.	N. Y., Cents.
Jan.	25.82	55.56	21.98	47.57	26 423	57.055
Feb.	25.41	55.09	22.11	47.80	26.665	57.592
Mar.	25.00	54.23	22.49	48.72	26,164	56,741
April.	24.34	52.72	23.38	50.56	24 974	54.202
May.	23.71	51.31	24.89	54.11	.....	.....
June.	24.17	52.36	24.29	52.86	.....	.....
July.	24.38	52.88	24.86	53.92	.....	.....
Aug.	24.23	52.52	25.63	55.36	.....	.....
Sept.	23.88	51.52	26.75	58.00	.....	.....
Oct.	23.40	50.57	27.89	60.36	.....	.....
Nov.	22.70	49.07	27.01	58.11	.....	.....
Dec.	22.21	48.03	25.73	55.375	.....	.....
Year	24.09	52.16	24.75	53.57	.....	.....

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

ASSESSMENTS.

Company.	Delinquent.	Sale.	Amount.
Allouez, Mich.	Sept. 26	.....	1.50
Belmont, Utah	May 7	June 5	.10
Caledonia, Nev.	May 31	June 21	.15
Con. Cal. & Va., Nev.	May 20	June 10	.25
Good Hope, Utah	May 19	June 11	.03½
Hale & Norcross, Nev.	May 31	June 24	.10
Jenny Lind, Cal.	June 9	.....	.01
Lower Mammoth, Utah.	May 26	June 14	.05
Mexican, Nev.	June 13	July 7	.15
Naildriver, Utah.	June 3	June 20	.03
N. Y. Bonanza, Utah.	June 7	June 28	.03
Sierra Nevada, Nev.	June 8	June 27	.10
Skylark Copper, Utah.	June 15	July 5	.01
Utah Con., Nev.	June 6	June 27	.10
Utah Mont., Utah.	May 26	June 10	.01
Wabash, Utah	May 23	June 14	.05
White Pine Copper, Nev.	June 10	.....	.08
Yellow Jacket, Nev.	June 10	July 13	.10

DIVIDENDS.

Company.	Latest Dividend. Payable.	Rate.	Total.	Total to date.
†Amalgamated Cop'r.	May31	.50	$769,460	$24,278,276
†Calumet & Hecla.	June 31	10.00	1,000,000	$5,350,000
†Cheneral Chem., pf.	July 1	1.50	150,000	3,025,178
Esperanza, Mex.	June 15	.25	113,750	1,267,949
Iron Silver, Colo.	June 1	.10	50,000	3,000,000
‡Mex. Coal & Coke.	June 1	3.00	150,000	150,000
†National Lead, pf.	June 15	1.75	260,820	14,493,808
Oil City, Petr., Cal.	June 1	.00½	2,500	7,500
28th Oil, Cal.	June 1	.10	6,000	24,000
*Pac. Coast Borax.	May 28	1.00	19,000	1,163,500
†Standard Oil.	June 15	8.00	7,760,000	231,260,000

* Monthly. † Quarterly. ‡ Semi-annually.

STOCK QUOTATIONS

NEW YORK.

Company.	Par val.	May 18 H.	May 18 L.	May 19 H.	May 19 L.	May 20 H.	May 20 L.	May 21 H.	May 21 L.	May 23 H.	May 23 L.	May 24 H.	May 24 L.	Sales.
Acacia, g.	1											7		1,000
Alice, g. s.	25	40												300
†Amalgamated, c.	$100	49⅜	49	49	48⅜	49⅜	48⅜	50	49½	51⅜	49⅛	51	49⅞	100,955
Anaconda, c.	25			76						76	74			700
Belcher, s.	3											35		300
Best & Belcher, s.	3											1.60		100
Brunswick	1			8		8						8		3,500
Caledonia, s.	1											79	78	400
Challar, s., g.	2½	19	18			21								700
Chrysolite, s. l.	50	.10												500
C. K. & N., g.	1													
Confidence, s.	3							1.05						100
Con. Cal. & Va., g. s.	2½	1.70		1.70		1.75		1.70		1.70		1.80	1.70	1,154
Con. Imperial										.03½				1,000
Cripple Creek, g.	1	8						8						2,200
Crown Point	1			23						21	20			500
Elkton, g.	1			85						66				400
El Paso, g	1			82						80				1,000
Gold Dollar	1					4¼								500
Gould & Carry	1							28	27					600
Greene Con., c.	10	15½	14¾	15½	15	15	14⅞	15¼	14¾	15⅜	15¼	15⅛	15	4,980
Hale & Norcross	3					63	62			65		62		700
Homestake, g.	100													
Iron Silver, s. b.	20											2.10		200
Isabella, g.	1			30		32						31	30	1,800
Justice, s.	21					12								100
Mexican, s.	3							1.80				1.75		300
Mollie Gibson, g.	5													
Moon Anchor, g.	5					9								500
Moulton, g.	25					19								200
Occidental, s.	3													
Ophir, s.	3	5.00						5.50						250
Pharmacist, g.	1									03				300
Phœnix, g.	1	.04		.14		.11		.10		.10		10	9	4,800
Portland, g.	1			1.70						1.70				200
Potosi, s.	1			.15		.17	.16			.18				600
Quicksilver, Pf.	100													
Savage, s.	3					.36	.35							400
Sierra Nevada, s.	3	.46		.45										500
Silver Hill, g. s.	1													
StandardCon., g. s.	10													
Tennessee, c.	25					30								100
Union Con., g. s.								66				65		300
Union Copper	10					⅝	⅝			⅝		1⅜		420
United Copper	100													100
White Knob, c.	10	7		6½				6½		7	.06½			400

c—Copper. g—Gold. l—Lead. s—Silver. Total sales, 133,079 shares
†Ex-dividend.

BOSTON, MASS.

Company.	Par val	May 18 H.	May 18 L.	May 19 H.	May 19 L.	May 20 H.	May 20 L.	May 21 H.	May 21 L.	May 23 H.	May 23 L.	May 24 H.	May 24 L.	Sales.
AdventureCon., c	$25	1⅜	1¾			1¾		1⅞		2	1⅝			207
Allouez, c.	25	4	3⅞	4		4	3⅞	4⅛	4	4⅛	4	4⅛	4	1,592
†Amalgamated, c.	100	49¼	48⅞	49	48⅜	49⅜	48⅜	50	49¼	51⅜	49⅞	56⅞	49¾	20,197
Am. Z. L. & Sm.	25											9⅜	9⅛	
Anaconda, c. s.	25													
Arcadian, c.	25							40						30
Atlantic, c.	25							7½		8	7	8		132
Bingham Con.	50	20½						20⅛		21	20½	21⅛		490
Bonanza Dev. g.	10													200
Calumet & Hecla	25									458		460		7
Centennial, c	25	19½		19	18⅞	19¼	19	19½		20	19½	19¾	19	1,362
†Central Oil	25	9	8¾	9¾	9	10	9½	9				9¼		1,130
Con. Mercur, g.	5			31				33		32	30	30	25	3,640
Copper Range	100	42⅜	42¼	42½	41	42½	41⅛	42⅞	42½	43½	42¾	43¼	42½	4,152
Daly West, g. s. l	20	23½	23	22½		22¾		23		24	22¾	24½	23½	1,715
Dominion Coal	100	65½	65	64⅝	64½	64						64¾	64	310
Preferred														
Dominion I. & S.	100			10		11⅛	10½	10		11				155
Elm River, c.	12													
Franklin, c.	25			7½								7½	7¼	230
Granby Con.	10	3⅛		3⅜		3½	3⅜			3¾		3½	3¾	3,625
Guanajuato Con.	5			1⅝		1½	1¼	1¼		1¼	1⅛	1¼		1,035
Isle Royal Con.	25							6½		7	6½			250
Mass Con., c.	25	3½	3	3		3						3½		470
Mayflower, c.	25													
Michigan, c.	25									4				125
Mohawk, c.	25			39⅝	39½	39⅝	39½			40½	40	40	39⅞	745
Mont. Coal & C.	25	5	4½	4½		4⅝	4¼	4⅜	4¼	4¼	4			3,360
Mont'l & Boston.	5													
New Idria, q.	5													
Old Colony, c.	25													
Old Dominion, c.	25	12½		12	11½	11½				12⅝		13⅜	12½	1,543
Osceola, c.	25			56		56	55¼	58		57	56⅜	56⅜		260
Parrot, s. c.	10			24						25	24¼			224
Phœnix Con, c.	25	1⅜	1⅝	1½		1½		1¾	1½			1½		400
Quincy, c.	25			80						80		82		24
Rhode Island, c.	25									1.00	50			60
Santa Fe, g. c.	10	1½												50
Shannon, c.	10	7¼	7 7/16	7⅛	7 7/16	7¼	7	7⅛	7	7⅛	7	7	6½	5,895
Tamarack, c.	25											90		2
Trinity, c.	25			3¾						3¾				60
Union C., T. & M.	25							2½						100
United States, g.	10	20	19⅝	20	19¼	20	19⅝	20	19⅝	19¾	19¾	19⅝		1,071
U. S. Coal & Oil	25	9½	9	9⅛	8			9¾	9¼	10⅜	9½	9⅝	9½	3,851
Utah Con., g. c.	5	33⅜	33¼	33⅜	33¼	33½	33¼			34	33½	33½		1,739
Victoria, c.	25			3		3	2¾							355
Winona, c.	25	6⅜		6		6	5¾			6				560
Wolverine, c.	25	70		70		70¾		70½		71				23
Wyandot, c.	25			50								60		350

c—Copper g—Gold. l—Lead. q—Quicksilver. s—Silver. Total sales, 61,824 shares.

COAL, IRON AND INDUSTRIAL STOCKS.

Company.	Par val.	May 18 H.	May 18 L.	May 19 H.	May 19 L.	May 20 H.	May 20 L.	May 21 H.	May 21 L.	May 23 H.	May 23 L.	May 24 H.	May 24 L.	Sale
Allis-Chalmers	$100	6												257
Preferred	100					39¾								100
Am. Agr. Chem	100													
Preferred	100													
Am. Sm. & Ref.	100			49⅜		49¼	49⅛	43¾	49	50¼	49⅛	50	49⅜	6,150
Preferred	100	95	94¾	95¼	95	95⅛	94¾	95¼	95	95⅜	95¼	96	95⅜	5,848
Col. Fuel & I.	100	28¾	28½	28½	28	28				29⅛	28¾	29¼	28¾	2,215
Col. & H. C. & I.	100					11				13⅛	13			570
Crucible Steel	100	45⅛		43¾	43⅜			41⅝				41⅝		230
Preferred	100			36½		36½		36⅛		36¾	36¼			215
General Chem	100													
Preferred	100													
Mong. R. Coal	50					8						8		370
Preferred	50													
National Lead	100	1¼	18¾	19⅛	18¾	19	18⅞	19¼		19¼	19¼	19½	19½	4,350
Preferred	100					90½								150
Phila. Nat. Gas	100	38												225
Preferred	100							43⅞						200
Pittsburg Coal	100	15		14¾		15	14⅜			14⅞		15		1,760
Preferred	100	56	55¾	56	55¾	55⅞	55⅝	56	53¾	55¾	55½	55⅞	54⅜	2,450
Republic I. & S.	100	8¼						6½		7	6⅞			1,200
Preferred	100	37¾	37	37¾	37½	38				40	38			3,235
Sloss-Shef S. & I.	100					35½	35	38	35½			33½		800
Preferred	100													
†Standard Oil	100	625		624	620¼	†621	612	615				618		135
Tenn. C. I. & R. R.	100	33	32½	33	32	33		33¾	33¼	35	33¾	34¾	33½	8,400
U. S. Red. & Ref.	100													
U. S. Steel Corp.	100	9⅛	8⅞	9⅛	8¾	9	8⅞	9¼	9⅛	9½	9⅛	9¼	9	27,523
Preferred	100	53½	52⅛	52⅞	51⅞	53½	52½	54⅜	53	55¼	54⅛	54⅞	53¼	189,521
Va.-Car Chem.	100	27		27						27¾	27½	27¼		1,230
Preferred	100			130¼								100		372

*Pittsburg exchanges; all others, New York. Total sales, 267,562.
†Ex-dividend.

COLORADO SPRINGS, COLO.

Company.	Par Val	May 14 H.	May 14 L.	May 16 H.	May 16 L.	May 17 H.	May 17 L.	May 18 H.	May 18 L.	May 19 H.	May 19 L.	May 20 H.	May 20 L.	Sales
Acacia	$1	.06⅜	.06⅛	0 ¾	.0 ⅛	.06¾	.06½	.06¾	.06½	.06¾	.06½	.06⅝	.06¼	2,000
Anaconda	5	.16	.12	.16	.12	.16	.12¼	.16	.12¼	.16	.12¼	.16	.12½	
Colo. City & M.	1	.02¾	.02⅜	.02⅝	.02¼	.02⅝	.02	.02¼	.02	.02¼	.02	.02¼	.02	6,500
C. K. & N.	1	.30¾	.30	.32	.30	.33½	.29	.34	.30	.34½	.31	.36	.35	6,000
Cripple Ck. Con.	1	.08¼	.07¾	.08¼	.08	.08¾	.08	.08¼	.07⅞	.08½	.08	.08½	.08¼	1,000
Des Moines	1	.02⅛	.01½	.02¼	.01½	.02¼	.01½	.02¼	.01½	.02¼	.01½	.02¼	.01½	
Doctor-Jack Pot.	1	.06¼	.05⅞	.05¾	.05½	.05¼	.05⅛	.05½	.05⅛	.05⅝	.05	.05½	.04⅞	10,000
Elkton Con.	1	.65⅜	.65⅜	.65½	.64½	.64½	.63½	.64	.63½	.65	.63¾	.64	.63	4,200
El Paso.	1	.85½	.83½	.84	.82	.83⅜	.83¼	.81½	.81	.80	.79¾	.81¼	.81	17,500
Gold Dollar Con.	1	.05	.04⅞	.05	.04⅝	.05	.04⅞	.05	.04⅞	.05½	.04¾	.05	.04⅝	3,000
Gold Sovereign	1	.06½	.06¼	.06½	.06¼	.06¾	.06½	.06¾	.06⅝	.06⅝	.06½	.06⅝	.06⅜	12,000
Golden Cycle	1	.45		.45		.47	.45	.48	.45	.47	.45	.47	.45	2,000
Golden Fleece	1	.02		.02		.02				.02		.02		
Hart	1	.02⅛		.02⅛		.02⅛		.02½		.02		.02		
Isabella	1	.32	.30½	.32	.31¼	.32½	.30⅜	.32½	.30½	.32½	.30¼	.32½	.30	500
Jack Pot	1	.09	.05	.09	.05	.03	.05	.07	.04½	.07	.05	.09		
Keystone	1	.04¾	.04½	.04⅝	.04¼	.04⅞	.04⅜	.04¾	.04⅜	.04⅞	.04¾	.04⅞	.04¾	4,000
Last Dollar	1	.40		.40		.35		.25	.15	.15		.15		500
Lexington	1	.04	.03¾	.04	.03½	.04	.03⅝	.04	.03¾	.04	.03½	.04	.03⅞	1,000
Little Puck	1	.03¾	.03⅜	.03⅝	.03⅜	.04¼	.04⅛	.04⅛	.04	.04	.03⅞	.03⅞	.03⅝	75,000
Mollie Gibson	1	.05½	.05	.05¼	.04½	.05⅛	.04½	.04¾	.04⅛	.06	.04	.07	.04⅜	2,000
Moon-Anchor	5	.09	.08	.09	.08¼	.08¾	.08⅜	.09	.08	.09	.08	.09	.08	3,000
New Haven	5	.02⅞	.02¾	.03	.02⅝	.03	.02⅝	.02¾	.02⅝	.03	.02½	.02⅞	.02¾	2,000
Old Gold	1	.08½	.08⅜	.09½	.08⅛	.09⅛	.08⅛	.08¾	.08	.08⅞	.07¾	.08⅞	.08	4,000
Pharmacist	1	.03½	.03¾	.03⅞	.03¾	.03⅞	.03½	.03¾	.03¼	.03¾	.03⅜	.03⅞	.03⅝	12,000
Pinnacle	1	.03		.03		.03		.03				.03		
Portland	1	1.73	1.70	1.75	1.70	1.75	1.65	1.75	1.67½	1.75	1.64	1.80	1.69	3,100
Vindicator Con.	1	.68		.75		.62	.58	.75	.55	.75	.50	.75		500
Work	1	.07½	.07	.07½	.07	.07⅝	.06⅞	.07¼	.06¾	.07¼	.06¾	.07⅜	.06½	2,000

Total sales, 173,800 shares.

SAN FRANCISCO.

Company.	Location.	May 12 H.	May 12 L.	May 13 H.	May 13 L.	May 14 H.	May 14 L.	May 16 H.	May 16 L.	May 17 H.	May 17 L.	May 18 H.	May 18 L.	Sale
Golden Anchor	Nev.													
MacNamara	Nev.	.20		.19		.20	.19	.19				.20		18,900
Mont. Tonopah	Nev.	1.62½	1.60	1.65		1.65	1.62½	1.65	1.60	1.60		1.60	1.57½	5,355
Ton. Belmont	Nev.	.71	.70	.71	.70	.70	.67	.72	.68	.71		.68	.67	6,800
Ton. Midway	Cal.	.40	.39	.39				.38		.38		.38		4,400
Ton. Mg. Co.	Nev.							8.75		8.75				700
Ton. North Star	Nev.	.28				.27		.20	.28			.27		1,000
Ton. & Salt Lake												.61		100

*San Francisco & Tonopah Mining Exchange.
Total sales, 37,255 shares.

COLORADO SPRINGS (By Telegraph).

Company.	May 23 H.	May 23 L.	May 24 H.	May 24 L.	Company.	May 23 H.	May 23 L.	May 24 H.	May 24 L.
Anaconda	.14⅛	.12⅛	.13	.12	Jack Pot				
Cripple Ck Con.	.08⅛	.08¼	.08⅛	.08⅜	Last Dollar	.40		.40	
C. K. & N.	.35	.33¼	.35	.34	Mollie Gibson	.05½	.04¾	.05½	
Doctor-Jack Pot.	.04⅞	.04⅝	.05	.04⅝	Moon Anchor			.09	.07
Elkton Con	.66	.64½	.66	.65	Old Gold	.08⅜	.07½	.08¾	.08¼
El Paso	.84⅛	.83	.84½	.84⅜	Pharmacist	.03⅞	.03½	.03¾	.03⅝
Gold Dollar Con.			.05	.04⅜	Portland	1.75	1.70	1.75	1.71½
Gold Sovereign			.06¾	.06⅜	Vindicator	.75	.50	.75	.50
Isabella	.30⅞	.30	.32	.28	Work	.07½	.06⅝	.07½	.06⅝

SAN FRANCISCO (By Telegraph).

Company.	May 23.	May 24.	Name of Company.	May 23.	May 24.
Belcher	.34	.33	Gould & Curry	.28	.29
Best & Belcher	1.50	1.50	Hale & Norcross	.60	.61
Caledonia	.77	.72	Mexican	1.65	1.70
Challenge Con.	.22	.22	Ophir	5.50	5.87½
Chollar	.17	.16	Overman	.39	.38
Confidence	1.10	1.10	Sierra Nevada	.43	.43
Con. California & Virginia	1.65	1.65	Union Con.	.65	.65
Crown Point	.22	.22	Yellow Jacket	.24	.24

PHILADELPHIA, PA

Company.	Par val.	May 18 H.	May 18 L.	May 19 H.	May 19 L.	May 20 H.	May 20 L.	May 21 H.	May 21 L.	May 23 H.	May 23 L.	May 24 H.	May 24 L.	Sales
Am. Cement	$10	7¾				7¾	7⅝							150
Cambria Iron	50											45½		20
Cambria Steel	50	19⅛	19⅛	19¼	19⅛	19⅛	19	19⅜	19⅛	18⅝	18⅞	18⅞	18¾	2,615
Penn. St. Pf.	100													
United Gas I.	50	82	81½	82	81¾	82	81¼	82½	82	83	82	82¼	82	1,120
Lehigh Nav.	50	74										74		8
Philadelphia	50	37⅞	37¾	37⅞		38¼	38	38		38¼	38	38⅛		1,971
U.S. Steel	100	9 5/16	8⅞	9	8 11/16	9 1/16	8¾	9⅛		9 5/16	9 3/16	9 5/16	9	3,010
U.S. Steel. pf.	100	53	52¼	52⅞	51⅞	53	52⅝	54⅛	53	55¼	54¼	54⅞	53¼	19,440

Total sales 28,334.

STOCK QUOTATIONS

ST. LOUIS, MO.*

May 21

Name.	Par Val.	Prices. Bid.	Ask.	Name.	Par Val.	Prices. Bid.	Ask.
Am.-Nettie, Colo....	$10	$0.10	$0.30	Columbia Lead, Mo.	$10	$3.50	$4.50
Catherine Lead, Mo.	10	1.40	2.50	Con. Coal, Ill.....	100	16.00	18.00
Central Coal & C....	100	60.75	62.00	Doe Run Lead Mo.	100	110.00	115.00
Central C. & C., pf..	100	70.00	71.00	Granite Bimet. Mt..	10	.35	.38
Central Lead, Mo...	100	110.00	115.00	St. Joe Lead, Mo,...	10	14 50	15.50

*By our Special Correspondent.

SALT LAKE CITY.*

May 21

Company	Par Val	High	Low	Sales.	Name of Company	Par Val	High	Low	Sales.
Ajax	10	.14⅜	.13¾	1,000	May Day	¼	.04⅝	.03⅞	18,100
Bul.-Beck Tun.	1	.06	.....	2,060	N. Y. Bonanza	1	.09¼	.08¾	3,500
Butler Liberal.	1	.13⅝	.12⅝	4,100	Petro	1	.05	.....	600
Carisa	1	.07¾	.07	3,500	Sacramento	5	.15⅛	.14¾	4,700
Century	1	.75½	.....	700	Silver King	20	51.50	.....	100
Con. Mercur	5	.31	.30	1,200	Silver Shield	1	.62¼	.....	1,000
Daly Judge	10	4.10	.....	100	Star Con	1	.14	.11¾	8,700
Daly West	20	22.70	22.50	325	Stockton	1	.75	.....	1,000
Grand Central.	1	4.60	.....	100	Swansea	1	.35	.....	800
La Reine	1	.05¼	.....	1,700	Tetro	1	.32	.29½	14,000
Little Chief	1	.03⅜	.01¼	35,500	Uncle Sam, Con	1	.19	.18¼	4,500
L. Mammoth	1	.16	.....	400	Victoria	1	1 17½	1.15	400
.....	.....	.....	.....	.....	Yankee Con	1	.36	.34	1,300

*By our Special Correspondent. All mines are in Utah. Total sales, 105,625 shares.

DULUTH, MINN.

Company	Par Val.	Bid.	Asked.	Company	Par Val.	Bid.	Asked.
Calumet & Arizona	$10	$105	$107	Lake Sup. & Pitts Dev.	$10	$150	$155
Calumet & Bisbee	10	3.00	4.50	Pitts. & Duluth Dev.	15	38.00	40.00
Calumet & Cochise	10	5.00	5.50	Shakespeare	10	.....	.20
Calumet & Pittsburg	10	30.00	32.00	United Mexican	10	.....	.50
Higgins Development	10	2.00	2.50	Wolverine & Arizona	10	3.50	.....
Junction Development	15	20.00	21.00	Yaqui	10	.....	1.00

TORONTO, ONT.

May 21

Company.	Par val	Prices. High.	Low.	Company.	Par val	Prices. High.	Low.
Black Tail, g	$1	.....	.....	Mountain Lion, g	$1	.....	.....
Cariboo-McKin	1	.....	.....	Payne, s. l	1	.13	.09
Cariboo-Hydr	1	.....	.....	Rambler Carib	1	.26	.22
Center Star, g. s	1	.28	.25	St. Eugene, g. s	1	.50	.42
.....	.....	.....	.....	War Eagle Con	1	.14	.10
.....	.....	.....	.....	White Bear	1	.04½	.03¾

g—Gold. l—Lead. s—Silver.

MEXICO.

May 13

Company.	Shares Issued	Prices, Mex. Bid.	Ask.	Company.	Shares Issued.	Prices, Mex. Bid.	Ask.
Durango:				Trompillo	1,200	$1,730	$1,740
Ca. Min. de Penoles	2,500	$3,590	$3,700	San Rafael y An., aviada	1,200	720	725
San Andres de la Sierra	200	10,000	.....	Soledad, aviada	670	700	710
Guanajuato:				Sorpresa, aviada	280	280	290
Angustias, Pozos	2,400	38	41	**Mexico:**			
Cinco Senores y An., aviadoras	2,000	36	40	Alacran	2,400	20	28
Cinco Senores y An., aviada	400	36	40	Aldebarren	2,000	22	28
Providencia, San Juan de la Luz	6,000	65	68	Buen Despacho	3,000	38	40
Queensland y Australia	300	45	55	Dos Estrellas	3,000	1,670	1,680
Guerrero:				La Esperanza (El Oro.)	3,000	1,500	1,500
Delfina, 1st serie	2,500	45	50	La Reformia, aviadores	2,000	18	20
Delfina, 2nd serie	2,500	35	40	Santa Ana, Esperanza	2,400	.....	90
Garduno y Anexas	7,200	30	40	**Michoacan:**			
Hidalgo:				Luz de Borda, aviadora	3,000	35	45
Amistad y Concordia	9,600	81	83	Luz de Borda, aviado	1,000	18	22
Carmen, aviada	1,100	60	90	Santiago y An., Tlal	4,000	3	5
Guadalupe Fresnillo Mill	1,000	170	200	**Nuevo Leon:**			
Guadalupe Fresnillo Mine	1,400	70	80	La Fraternal	1,000	580	620
La Reina y An., aviadora	5,800	3	5	Norias de Bajan	1,000	880	920
Luz de Maravillas, aviadas	1,100	.....	20	**San Luis Potosi:**			
Maravillas y An., aviador	1,080	110	140	Concepcion y An	3,000	80	84
Maravillas el Lobo	1,000	130	180	El Barreno, aviadora	2,000	60	63
Palma y An., aviador	1,800	8	16	Sta. Maria de la Paz	9,600	180	183
Refugio, aviada	12,800	680	740	San Diegoy Annexas	2,400	8	10
Santa Anay An., aviadora	1,800	50	70	**Zacatecas:**			
Santa Anay An., aviada	600	25	35	Asturiana y An	2,500	20	26
Sta. Gertrudis y An., aviadas	9,800	14	15	Candelaria y Pinos	2,500	45	50
Sta. Gertrudis y An., aviadora	28,800	81	81½	Esperanza y An	2,400	6	8
Santo Tomas Apostol aviadoras	5,100	2	3	Lourdes	2,500	20	25
San Felipe de Jesus, aviadora	3,600	17	20	Luz de Minillas, pagadoras	2,000	.....	.....
San Felipe de Jesus, aviada	1,200	6	10	Nueva Quebradilla, aviadoras	2,400	35	50
San Rafael y An.,				Nueva Quebradilla, aviadas	600	30	45
				San Carlos y Annexas	2,500	60	65
				Sta. Maria de Gaud	2,500	55	60
				Miscellaneous:			
				Bartolome de Medina	2,000	83	85
				Naica (Chihuahua.)	100	11,000	13,000
				Natividad (Oaxaca) aviadora	1,800	950	100
				San Francisco Hac	6,000	80	82
				Union Hacienda	3,000	270	280

LONDON.

May 13

Company.	Shares Issued.	Par value.	Latest dividend. Amt.	Date.	Quotations. Buyers.	Sellers.
		£. s. d.	s. d.		£ s. d.	£ s. d.
American:						
*Alaska-Treadwell	200,000	5 0 0	1 6	Apr., 1904	4 12 6	4 17 6
Anaconda	1,200,000	5 0 0	2 0	May, 1904	3 15 0	3 17 6
Camp Bird	820,000	1 0 0	9	May, 1904	1 5 0	1 7 6
Copiapo	112,500	2 0 0	6 10	May, 1903	1 0 0	1 5 0
De Lamar	80,000	1 0 0	1 6	May, 1904	11 3	13 9
El Oro	1,080,000	1 0 0	9	Jan., 1904	1 2 6	1 5 0
Frontino & Bolivia	128,682	1 0 0	3 0	July, 1901	7 6	10 0
Le Roi	200,000	5 0 0	5 0	Nov., 1899	16 3	18 9
Le Roi No. 2	120,000	5 0 0	1 0	Feb. 1904	15 0	17 6
Montana	657,128	1 0 0	6	April, 1899	9	1 3
Palmarejo & Mexican	445,000	1 0 0	rts.	April, 1903	7 6	8 0
Standard	500,000	4 0	2½	Sept., 1903	2 6	3 6
Stratton Independence	1,000,007	1 0 0	6	Dec., 1903	3 6	4 0
St. John del Rey	540,265	1 0 0	6	Dec., 1903	12 0	13 0
Tomboy	300,000	1 0 0	1 0	June, 1902	1 5 0	1 10 0
Ymir	200,000	1 0 0	1 0	Mar., 1902	3 9	5 0
European:						
Linares	15,000	3 0 0	5 0	Apr., 1904	3 10 0	4 0 0
*Mason & Barry	185,172	1 0 0	7 0	May, 1904	3 0 0	3 5 0
*Rio Tinto	325,000	5 0 0	37 6	May, 1904	51 12 6	51 17 6
*Rio Tinto, preferred	325,000	5 0 0	2 6	May, 1904	5 17 6	6 2 6
*Tharsis	625,000	2 0 0	7 0	May, 1904	4 5 0	4 10 0
West Australian:						
Associated	495,388	1 0 0	2 0	Jan., 1904	3 8 9	3 10 0
Cosmopolitan	400,000	1 0 0	1 0	Apr., 1904	11 9	12 3
Golden Horseshoe	300,000	5 0 0	6 0	Apr., 1904	8 1 3	8 3 9
Great Boulder	1,750,000	2 0	9	Mar., 1904	1 6 3	1 6 9
Gt. Boulder Persever'ce	1,400,007	1 0 0	1 3	May, 1904	1 1 3	1 1 9
Great Fingall	250,000	1 0 0	7 0	Apr., 1904	8 8 9	8 11 3
Ivanhoe	200,000	5 0 0	7 6	Apr., 1904	8 2 6	8 5 0
Kalgurli	120,000	1 0 0	2 6	Apr., 1904	5 8 9	5 11 3
Lake View	250,000	1 0 0	rts.	Aug., 1902	1 5 0	1 7 6
Oroya-Brownhill	450,000	1 0 0	2 6	Mar., 1904	3 12 6	3 15 0
Miscellaneous:						
*Brilliant Central	100,000	1 0 0	1 0	May, 1904	2 17 6	3 2 6
Briseis	600,000	1 0 0	.....	.....	7 6	8 6
Broken Hill	980,000	8 0	1 0	May, 1904	1 15 0	1 16 0
Mt. Lyell	275,000	3 0 0	4 3	Sept., 1903	16 6	17 6
Mt. Morgan	1,000,000	1 0 0	3	May, 1904	2 7 6	2 10 0
Waihi	497,412	1 0 0	4 6	June, 1904	5 18 9	6 1 3
Indian:						
Champion Reef	513,832	10 0	1 3	May, 1904	1 14 6	1 15 6
Mysore	566,043	10 0	5 6	Mar., 1904	6 7 6	6 10 0
Nundydroog	484,000	10 0	1 8	Mar., 1904	1 13 9	1 16 3
*Ooregum	343,000	10 0	1 3	Apr., 1904	1 1 3	1 3 9
*Ooregum, pfd	240,000	10 0	1 3	Apr., 1904	1 12 6	1 15 0
South African:						
Angelo	600,000	1 0 0	4 0	Feb., 1904	6 17 6	7 2 6
Bonanza	200,000	1 0 0	10 0	Feb., 1904	1 6 3	1 8 3
British South Africa	4,436,019	1 0 0	rts.	May, 1899	2 2 6	2 3 9
Cape Copper	300,000	2 0 0	4 0	Jan., 1904	3 1 3	3 3 9
Cape Copper, pfd	75,000	2 0 0	1 9	Jan., 1904	2 17 6	3 2 6
City & Suburban	340,000	4 0 0	8 0	Feb., 1904	6 2 6	6 7 6
Consol. Gold-Fields	2,000,000	1 0 0	.....	.....	6 12 6	6 13 9
*Crown Reef	120,000	1 0 0	18 0	Apr., 1904	14 10 0	15 0 0
De Beers, preferred	800,000	2 10 0	10 0	Jan., 1904	18 6 3	18 8 9
De Beers, deferred	1,000,000	2 10 0	15 0	Jan., 1904	19 1 3	19 3 9
East Rand	990,000	1 0 0	5 0	Aug., 1903	8 0 0	8 1 3
Ferreira	90,000	1 0 0	3 0	May, 1904	20 15 0	21 5 0
Geldenhuis	200,000	1 0 0	6 0	Feb., 1904	5 11 3	5 13 9
Geduld	400,000	1 0 0	rts.	Mar., 1902	6 13 9	6 16 3
Henry Nourse	125,000	1 0 0	10 0	Feb., 1904	8 15 0	9 0 0
Jubilee	50,000	1 0 0	5 0	Feb., 1904	4 15 0	5 0 0
Jumpers	100,000	1 0 0	2 6	May, 1904	3 5 0	3 10 0
Langlaagte	470,000	1 0 0	2 0	Feb., 1904	4 0 0	4 2 6
May	288,750	1 0 0	3 6	Feb., 1904	4 1 3	4 3 9
Meyer & Charlton	100,000	1 0 0	5 0	Jan., 1904	5 7 6	5 12 6
Modderfontein	290,000	1 0 0	rts.	Apr., 1902	9 11 3	9 13 9
Namaqua	94,331	2 0 0	3 0	Dec., 1903	3 7 6	3 12 6
New Jagersfontein	200,000	5 0 0	10 0	June, 1904	28 5 0	28 15 0
New Primrose	325,000	1 0 0	3 0	Mar., 1904	3 18 9	4 1 3
Rand	1,795,958	5 0	4 0	Aug., 1902	10 15 0	10 16 3
Robinson	750,000	5 0 0	5 6	Feb., 1904	9 17 6	10 2 6
Robinson Deep	950,000	1 0 0	3 0	Jan., 1904	5 10 0	5 15 0
Rose Deep	425,000	1 0 0	2 6	Feb., 1904	8 12 6	8 17 6
Salisbury	60,000	1 0 0	2 0	June, 1904	2 0 0	2 2 6
Village	400,000	1 0 0	3 0	Feb., 1904	6 17 6	7 2 6
Wemmer	80,000	1 0 0	10 0	Jan., 1904	11 5 0	11 15 0

*Ex-dividend.

LONDON (By Cable.)*

Company.	May 18 £. s. d.	May 25 £. s. d.	Company.	May 18 £. s. d.	May 25 £. s. d.
Anaconda	3 17 6	3 15 0	El Oro	1 3 1½	1 2 6
British So. Africa	2 1 3	2 1 3	Modderfontein	9 8 1½	5 12 6
Camp Bird	1 6 3	1 6 3	Rand Mines	10 11 3	10 13 9
Con. Gold Fields	6 15 0	6 16 3	Rio Tinto	51 2 6	51 0 0
De Beers	10 10 0	13 2 6	Simmer & Jack	1 16 0	1 16 3
East Rand	7 17 6	8 1 10	Tomboy	1 6 3	1 4 9

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS.

April 28

Company.	Location.	Capital Stock.	Par value.	Latest divs.	Prices. Opening.	Closing.
		Francs.	Fr.	Fr.	Fr.	Fr.
Anzin, Coal	France	.....	.....	280.00	5,600.00	5,599.00
Boleo, c	Lower Cal.	12,000,000	500	62.50	1,894.00	1,985.00
Champ d'Or, g	S. Africa	3,375,000	25	3.75	19.50	18.50
Courrieres, Coal	France	600,000	500	110.00	2,796.00	2,825.00
Fraser River, g	Brit. Col.	250,000	25	.....	5.50	5.50
Huanchaca, s	Bolivia	40,000,000	125	2.50	88.50	90.25
Laurium, z. l	Greece	16,300,000	500	25.00	320.00	320.00
Malfidano, z	Italy	12,500,000	500	50.00	593.00	594.00
Metaux, Cie. Fran. de	France	25,000,000	500	22.50	470.00	475.00
Mokta-el-Hadid, i. l	Algeria	18,312,000	500	40.00	875.00	885.00
Nickel, n	N. Caledonia	15,000,000	250	22.50	555.00	596.00
Penarroya, Coal	Spain	.....	500	45.00	1,080.00	1,073.00
Vielle Montagne z	Belgium	9,000,000	30	30.00	700.00	710.00
.....	.....	.....	.....	.....	.....	.....

c—Copper. g—Gold. i—Iron. l—Lead. n—Nickel. o—Oil. s—Silver. z—Zinc.